STEEL

The

Metalworking Weekly

JUNE 13, 1960

A PENTON PUBLICATION

Look for Electrical Machinery Output to Gain 250% by 1980

Tips for Better Safety Programs

Powdered Aluminum Slugs Improve Versatility of Impact Extrusions

Push for Record Sales in High Strength Steels Gains Momentum

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Steel Fabricators Fight for Profits

Construction is headed for a pretty good year. But balance sheets of steel fabricators still show red ink. James M. Straub, president, Fort Pitt Bridge Works, cites three reasons for this industry's plight: Cut-throat competition, inroads of competitive materials, high labor costs. There's a lesson for all metalworkers in the struggles of this industry and how it's fighting back—see Page 111.

NEW GIANT AT WORK on Double Diamond Gears

This huge, continuous, carburizing, hardening and draw furnace now permits even greater instrument control in heat treating DOUBLE DIAMONDS for maximum wear resistance and load-carrying capacity. So far as we can discover no more efficient furnace could be installed to achieve the quality characteristics our gear customers have come to expect.

At your request, our gear engineers would be pleased to describe this process in greater detail and to explain, as well, what our recently expanded facilities can mean in terms of this pledge: "DOUBLE DIAMOND Gears offer the advantages of lower installed cost and economical and dependable service on the job . . . gears that do credit to your product and reputation."

EATON

AUTOMOTIVE GEAR DIVISION
MANUFACTURING COMPANY
RICHMOND, INDIANA

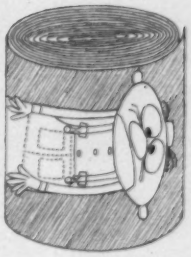
GEARS FOR AUTOMOTIVE, FARM EQUIPMENT AND GENERAL INDUSTRIAL APPLICATIONS
GEAR-MAKERS TO LEADING MANUFACTURERS

This Week in STEEL

The Metalworking Weekly

June 13, 1960 Vol. 146 No. 24

Tips for Better Safety Programs



Chester Sloehold, here, got wrapped up in his work as the result of an industrial accident. Direct costs of on-the-job mishaps, high as they are, are only one-fourth of the total cost to employers. Indirect costs result when: Others stop work to find out what happened; an inexperienced man has to be trained for the injured worker's job; supervisors' time is wasted investigating the accident; machinery has to be repaired. For safety tips, see PAGE 114

How Electrical Machinery Industry Will Grow

Value added by manufacture will be almost six times greater in 1980 than it is this year. Employment will increase by nearly 2 million. Physical output will be three and a half times higher. Here are some of the probabilities for SIC Group 36, as seen by Eddy-Rucker-Nickels Co., management consultants, in the first of six metalworking growth studies prepared for STEEL. PAGE 122

Positioner Solves Heat Treating Problem

Castings are positioned for induction heating, without the use of machined surfaces for location, in a pair of heat treating machines designed for Chevrolet-Cleveland Div., General Motors Corp., Cleveland. Equipment designed and built by Tocco Div., Ohio Crankshaft Co., Cleveland, locates the parts on a rotating table, checks them for correct position, and carries them through a hardening treatment. Righthand and lefthand castings are positioned by separate shielded units that make production heat treating practical. PAGE 156

Powdered Aluminum Slugs Improve Impact Extrusions

Powdered unsintered slugs are the key to a new impact extruding process developed by Aluminum Co. of America. The method, says Alcoa, extends the forming range of parts which are more intricate and more accurate than those made with conventional slugs. PAGE 161

Sales Push in High Strength Steels Gains Momentum

"The first quarter was the best three month period for sales of high strength steel that we've ever had," a major producer reports. "Our shipments through April were half as large as they were in all of 1957, our biggest year to date." Adds a maker of heat treated alloy steel: "We're undoubtedly headed for a record year. We'll triple our 1959 shipments." Here's how the industry is selling in depth. PAGE 199

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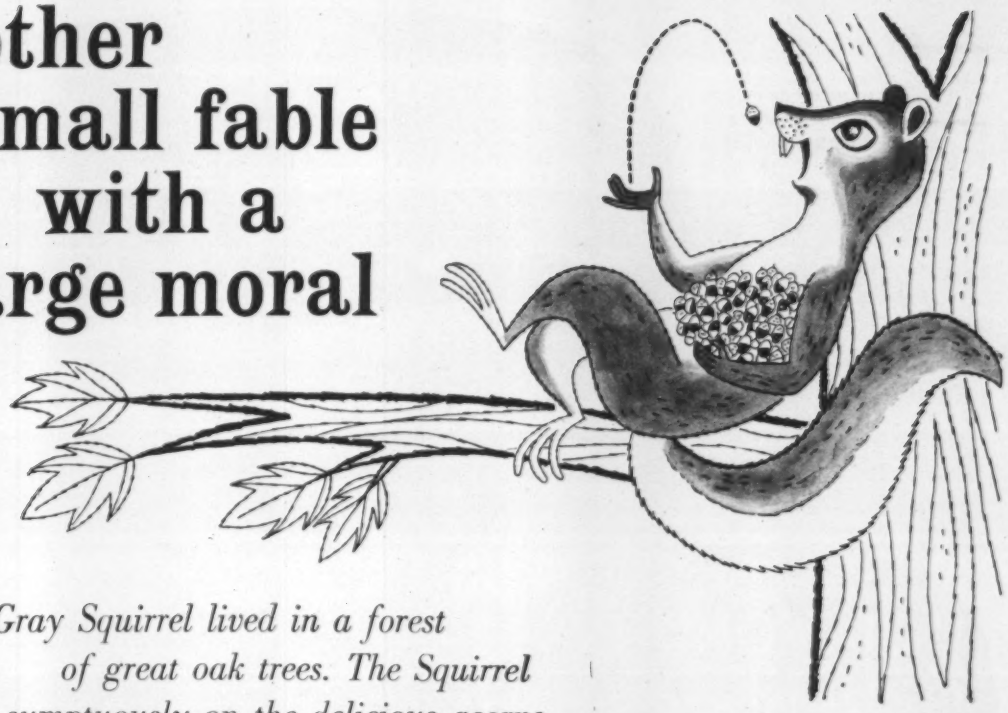
Another small fable with a large moral



A Gray Squirrel lived in a forest of great oak trees. The Squirrel dined sumptuously on the delicious acorns that grew high on the branches.

But one day a visiting squirrel told of another forest, quite far away, where the trees were not nearly so tall, and where the acorns were much easier to reach.

The Gray Squirrel set out for those easy pickings in the distant forest. They were tasty indeed.

On his third trip he met a Hungry Fox.

End of story.

MORAL: Smart squirrels know it's wiser in the long run to gather acorns in their own back yard.

Whether your needs be acorns or steel, your safest, most reliable suppliers are right here at home. No one knows the needs of American steel buyers better than American steel makers. To serve you, and serve you well, is our primary concern—not just today and tomorrow—but year after year.

For quality steel of certified analysis, meeting the appropriate specifications, you can rely on Bethlehem Steel for such products as reinforcing bars, wire and wire products, pipe, structural shapes, plates, carbon bars . . . hot-rolled, cold-rolled, and galvanized sheets . . . transmission towers and other fabricated steel, wire rope, and industrial fasteners.

And remember, our engineers are on call to help you solve your steel-working problems.

Steel

for Strength
. . . Economy
. . . Versatility

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

BETHLEHEM STEEL

. . . operator reads remote scales on "Utiliscope" mounted on control platform

DIAMOND TV REDUCES MACHINING TIME 80 PERCENT

Machining large components to close tolerances requires frequent shut-downs to read remote transverse and longitudinal scales. Morgan Engineering, in conjunction with Ingersoll Milling Machine Co., solved this problem by mounting Diamond closed circuit industrial TV on their new boring mill. The result: machine operators now read both scales without leaving the control station . . . maintain complete machining accuracy and, at the same time, reduce time costs as much as 80 percent. Diamond "Utiliscope" also speeds set-up time by permitting accurate adjustments right from the control platform.

Diamond closed circuit TV's rugged construction and versatility makes it readily adaptable to many operations that require an accurate and constant check of remote scales. Some of its many applications include:

VERTICAL BORING MILLS to view operations up to 8 feet away!

AUTOMATIC WELDING to maintain constant, accurate check of inside diameter welding.

STEEL SHEARING AND CUTTING OPERATIONS to provide continuous visual control of charging slabs into re-heat furnace or hot strip mill and consistently greater accuracy in cutting long length blooms.

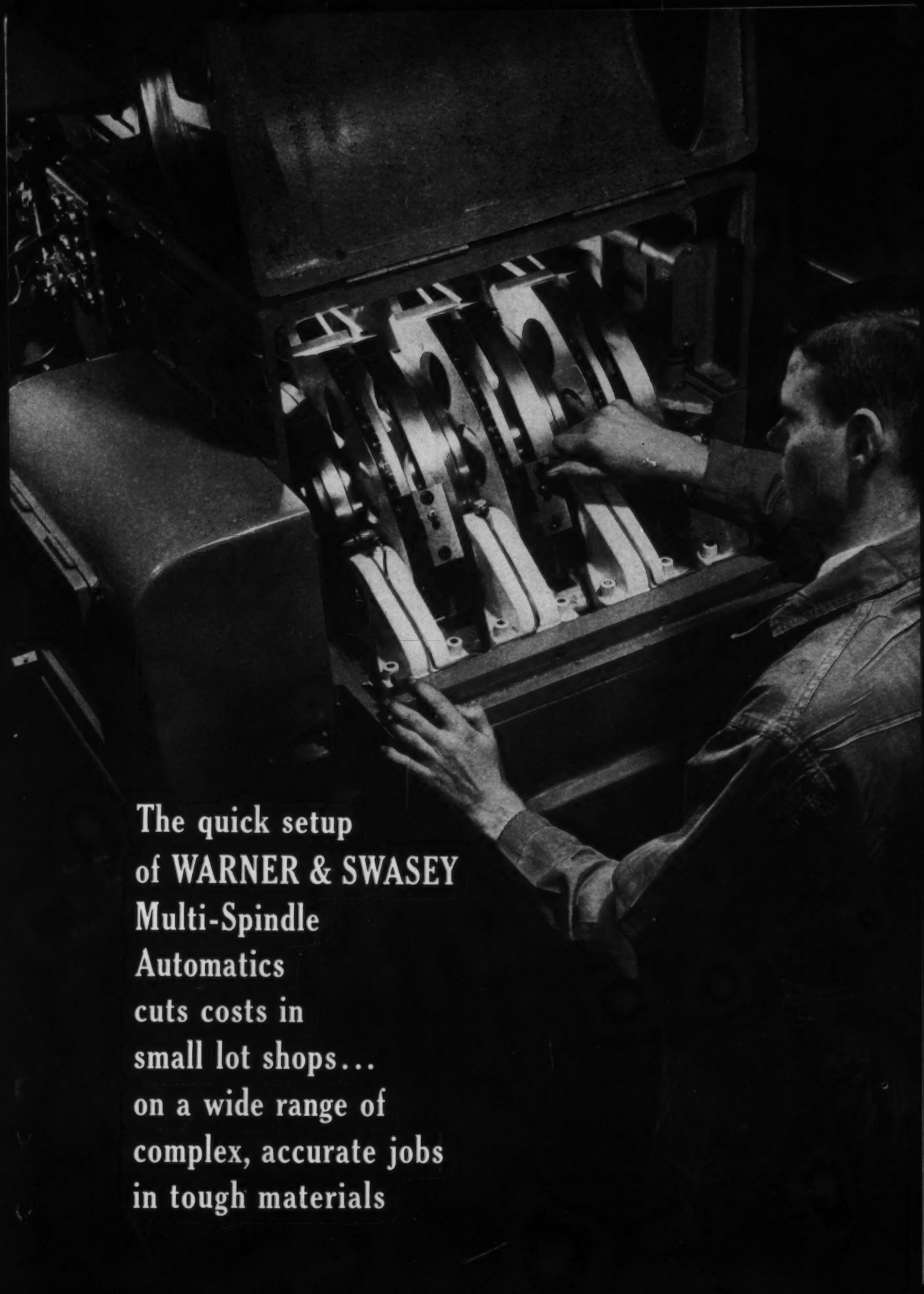
FORGING DIES to furnish continuous push-button control in die placement.

Let Diamond skilled application engineers analyze your operations. They'll show you where "Utiliscope" can give you more accurate control, even under the most difficult, hot, dirty, or dusty conditions. Phone Lancaster, Ohio, OLive 3-6540 or TWX 490 and ask for our Field Survey FS33B.

Diamond® Electronics

DIVISION OF DIAMOND POWER SPECIALTY CORPORATION

LANCASTER, OHIO



The quick setup
of WARNER & SWASEY
Multi-Spindle
Automatics
cuts costs in
small lot shops...
on a wide range of
complex, accurate jobs
in tough materials

Family living today is richer, easier because of a bright array of appliances, housewares, and hardware that employ one of the breathtaking Nickeloid Metals. Scores of manufacturers already know the extra beauty, the practical utility, and the production economy made possible by these metals with gleaming finishes of chromium, brass, copper, or nickel. Product designers have combined the functional and the decorative to build faster, more profitable sales. Possibilities are endless. Nickeloid Metals, being completely pre-finished, simplify the entire manufacturing process, with greater profit. Let us set up a workshop session with your executives in design, sales, purchasing, and production. We have sales engineers at nearby sales offices qualified to unfold this fascinating picture. Or write us for descriptive catalog.

Nickeloid helps make a family's world

NICKELOID METALS
SINCE 1898
NM

AMERICAN NICKELOID COMPANY, PERU, ILLINOIS · Plants: Peru, Ill., and Walnutport, Pa.

Vender Relations—Plus

This unusual "letter" of commendation was sent by a Japanese steelmaker to Lectromelt Furnace Div., McGraw-Edison Co., Pittsburgh. The 3 by 5 ft plaque—examined here by F. H. Plank, Lectromelt's president—was hand carved from a single piece of camphor wood.

Its English and Japanese message comments on the "good performance" of four Lectromelt furnaces. Inlaid white paint accentuates the characters. The border, which resembles hammered metal, is decorated with carved chrysanthemums, painted yellow and white. Also in the border are three Japanese characters that mean "peace, prosperity, and good will."

Chosaku Kojima, who delivered the plaque on behalf of his company, Chubu Steel Plate Co. Ltd., Nagoya, Japan, says the wood came from a tree that was 300 to 400 years old. Camphor trees, Mr. Kojima said, are protected by the Japanese government, and special permission is required to have one cut.

Beating the Detroit Scribes

In a conversation with STEEL's Detroit Editor Don Postma, we learned that the three dozen automobile writers in Detroit guesstimate U. S. passenger car production at a yearend luncheon given by the Automobile Manufacturers Association. Courtesy of AMA, we obtained the newsmen's forecasts for 1960. The highest pegs output at 7,876,000 cars and the lowest puts it at 5,757,000. If you're a middle of the roader, the average is 6,577,000.

We asked Don for his midyear forecast. He replied, hedgingly: "Say 6.2 million to 6.3 million—with 50,000 units either way (pause) 6.3 looks reasonable." For the record, the first year Don was in Detroit, he beat all the other writers. The second year, our man won in the truck production category. In the third year, he got the booby prize. Last year, no prize—which, we must conclude, is a step up from the booby prize.

What's Your Guess?

With all that to go on, why not make your own guess in STEEL's Beat-the-Experts contest? Just enter your prediction on the coupon in this department and send it in before midnight, June 30.

The best guesser will win the use of any one of Ford Div.'s 21 cars for two weeks. Five runners-up will win full color prints of a dream car rendered for the contest by Virgil M. Exner, Chrysler Corp. vice president and director of styling.

Hot Machining Potential

Next week, you'll be reading a story that Machine Tool Editor Bob Huber has been bird dogging for two years. The article will be based on Cincinnati Milling Machine Co.'s comprehensive research report to the Manufacturing Methods Div., Air Materiel Command—its title: "High Temperature Machining Methods."

Ten to fifteen years ago, hot machining was interesting but not too significant, says Bob. Now, with high strength, thermal resistant materials,

I believe _____ automobiles will be produced in the U. S. from Jan. 1 through Dec. 31, 1960.

Mail this to:

Ed Service
Beat-the-Experts
STEEL
1213 W. 3rd St.
Cleveland 13,
Ohio

PRINT NAME _____

POSITION _____

COMPANY _____

ADDRESS _____

CITY _____

STATE _____

Entries must be postmarked before midnight, June 30.

"the HITCHINER way..."

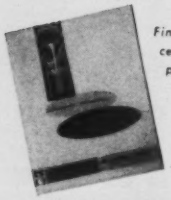
...and non-machinable super alloys in INVESTMENT CASTING

These spray nozzles for highway striping paint sprayers were formerly machined out of cold rolled bar stock. When ordinary paint was used, these nozzles functioned satisfactorily. However, when ground glass was added to the paint for reflecting purposes excessive wear caused frequent replacement.

By "the HITCHINER way . . .", we were able to engineer the manufacture of this part by investment casting in a non-machinable type alloy exhibiting a very high degree of resistance to both wear and corrosion.

This change of alloy, which eliminated the need for frequent nozzle replacement, was made possible through investment casting because the required close dimensional tolerances and detail could be cast to size.

Through the wide freedom of choice in alloy, as well as through flexibility in design and the elimination of expensive machining operations, investment casting may possibly solve your metal parts manufacturing problems. Send us your sample or blueprint and find out with a Hitchiner "engineered quotation" — no obligation.



Find out how our new ceramic shell technique can possibly benefit you. Send for our free, new revised brochure on the latest investment casting methods.

HITCHINER
MANUFACTURING COMPANY INC.
MILFORD 33, NEW HAMPSHIRE

Coast to Coast Engineering Representatives

hot machining may come into its own. It can make some high property steel alloys behave like their more common cousins.

In an editorial meeting, the editors kicked around the idea of putting the STEEL Exclusive bug on Bob's story. He demurred, saying: "We are the first business paper (jargon will creep in when editors assemble) to report the report. I'm steamed up about it—it's a hot topic (puns also creep in)—so hot that it won't remain exclusive for long. Let's simply call this one a first for STEEL."

We Were Glad to Oblige . . .

. . . a request from Edwin H. Lockwood, Frederick, Md. The conversion chart, "How Temperature Scales Compare," which ran in our Mar. 14 issue, will be reproduced in the book "Electric Heating." It's a text Mr. Lockwood is revising for International Correspondence Schools, Scranton, Pa.

We Must Be Vigilant Dept.

Last week we were caught with our facts out of whack. We hasten to make amends to the Steel Service Center Institute, Cleveland, and the companies that received advertising awards at the institute's annual meeting in Miami Beach, Fla.

In the category, best single advertisement in the interests of Steel Service Centers, first place went to Connors Steel Div., H. K. Porter Company Inc., Birmingham; second place, Jones & Laughlin Steel Corp., Pittsburgh; and third place, Weirton Steel Co., Weirton, W. Va.

For the best advertising program, Bethlehem Steel Co., Bethlehem, Pa., took top honors; Republic Steel Corp., Cleveland, took second; and Jones & Laughlin took third.

We had credited J & L with two seconds.

You Can Win $1000 This Month . . .

. . . in STEEL's Usership Idea of the Month Contest. Tell us, in 300 words or less, how you plan to USE an article or advertisement in this issue (or any other issue published this month—June, 1960) to help you accomplish an important personal or company objective. Be as specific as you can. If, in the opinion of the judges, yours is the best idea submitted—you will win $500.

There's more . . . You will win an additional $500 if you furnish written proof that you were successful in accomplishing your objective. Proof must be submitted within six months after you are declared winner of STEEL's Usership Idea of the Month Award.

You can enter as many times as you wish. Please identify your letters as Usership entries. They will be judged by a committee of STEEL's editors. All letters become STEEL's property.

Send your entries to me, Ed Service, Servicenter, STEEL, 1213 W. Third St., Cleveland 13, Ohio. Deadline for this month's contest is Aug. 1, 1960.

...Fluid Power news

REPORT NO. 11,802 AUTOMATIC METALS BRIQUETTING PRESSES

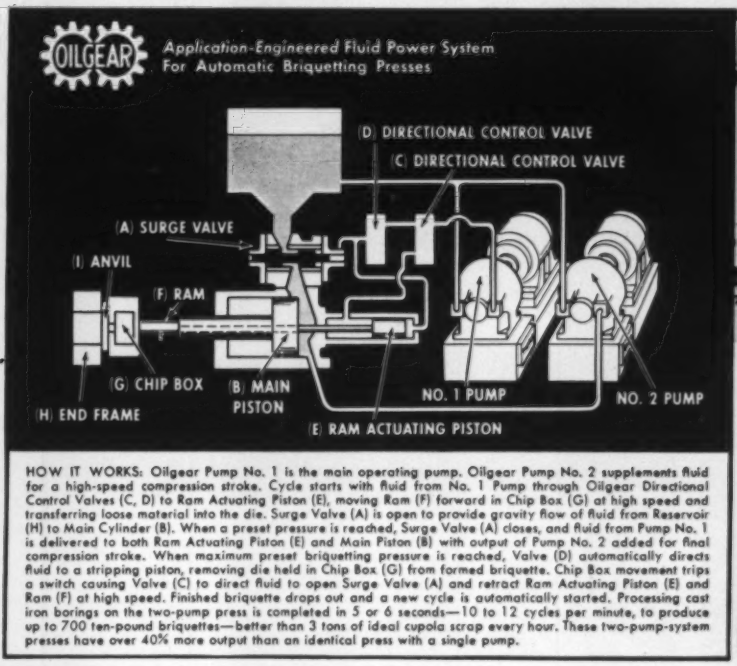
From Oilgear *Application-Engineering* Files

HOW OILGEAR-EQUIPPED BRIQUETTING PRESSES PRODUCE MORE—LONGER—AUTOMATICALLY

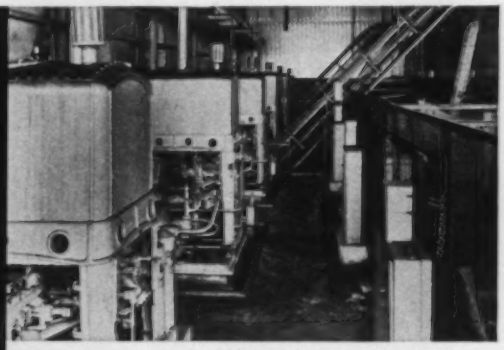
CUSTOMER: *Milwaukee Foundry Equipment Division of SPO Inc.*

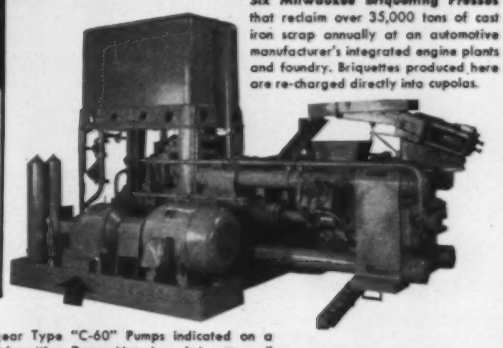
DATA: To power a line of presses specially designed for low cost, rapid conversion of bulky, low-grade metal turnings and borings into dense, uniform-sized briquettes to: conserve storage space; simplify handling; prevent storage oxidation—particularly with finely divided metals or sponge iron; provide sufficient density and size to melt rather than flash into oxide on entry into foundry cupola; control metal content; provide a simple means of accurate compounding for alloying or supplying a flux.

PRESS SYSTEM REQUIREMENTS: 1. Eliminate wear and maintenance costs resulting from use of gears and bearings. 2. To be controlled hydraulically, electrically, or electrohydraulically for automatic cycling at rates ranging from 9 to 17 strokes per minute. 3. Sufficient force to provide briquette densities of 70 to 80% with conservative pump loading. 4. Long life, rugged dependability . . . capable of years of continuous operation with an absolute minimum of maintenance.



HOW IT WORKS: Oilgear Pump No. 1 is the main operating pump. Oilgear Pump No. 2 supplements fluid for a high-speed compression stroke. Cycle starts with fluid from No. 1 Pump through Oilgear Directional Control Valves (C, D) to Ram Actuating Piston (E), moving Ram (F) forward in Chip Box (G) at high speed and transferring loose material into the die. Surge Valve (A) is open to provide gravity flow of fluid from Reservoir (H) to Main Cylinder (B). When a preset pressure is reached, Surge Valve (A) closes, and fluid from Pump No. 1 is delivered to both Ram Actuating Piston (E) and Main Piston (B) with output of Pump No. 2 added for final compression stroke. When maximum preset briquetting pressure is reached, Valve (D) automatically directs fluid to a stripping piston, removing die held in Chip Box (G) from formed briquette. Chip Box movement trips a switch causing Valve (C) to direct fluid to open Surge Valve (A) and retract Ram Actuating Piston (E) and Ram (F) at high speed. Finished briquette drops out and a new cycle is automatically started. Processing cast iron borings on the two-pump press is completed in 5 or 6 seconds—10 to 12 cycles per minute, to produce up to 700 ten-pound briquettes—better than 3 tons of ideal cupola scrap every hour. These two-pump-system presses have over 40% more output than an identical press with a single pump.





Six Milwaukee Briquetting Presses that reclaim over 35,000 tons of cast iron scrap annually at an automotive manufacturer's integrated engine plants and foundry. Briquettes produced here are re-charged directly into cupolas.

SOLUTION: Oilgear *Application-Engineered* systems consisting of Oilgear Type "C" Heavy-Duty Constant Displacement Radial Rolling Piston Pumps and Directional Control Valves. Pump requirements range from 23 gpm on the 75-ton Presses to 325 gpm on new 1000-ton presses. *Milwaukee Foundry Equipment*—builder of over 80% of all briquetting presses, and an exclusive user of Oilgear Fluid Power Systems since 1927—recently reported: "*We just modernized a press that had been in continuous cast iron briquetting operation for over 18 years . . . there had been no reported major maintenance . . . the Oilgear components still operated fine—with no appreciable signs of wear or loss in efficiency.*"

This is just one evidence—out of hundreds—of the long service life of Oilgear Systems. Ten or more years of continuous service is common with Oilgear equipment, rather than the exception . . . with many of these systems operating under adverse conditions—rapid cycling, grit-laden air, heat, and extreme humidity. Where the going is toughest—Oilgear Pumps just keep rolling along . . . quietly, efficiently.

One of the two Oilgear Type "C-60" Pumps indicated on a 350-ton **Milwaukee Briquetting Press.** Note how briquettes roll out of the press to be picked up by magnets.

With Oilgear Heavy-Duty System Components designed for thousands of hours of continuous service at full rated load, savings are compounded with every hour of uninterrupted performance. That's why machinery and equipment manufacturers and *their* customers say . . .

"for the lowest cost per year . . . it's Oilgear!"

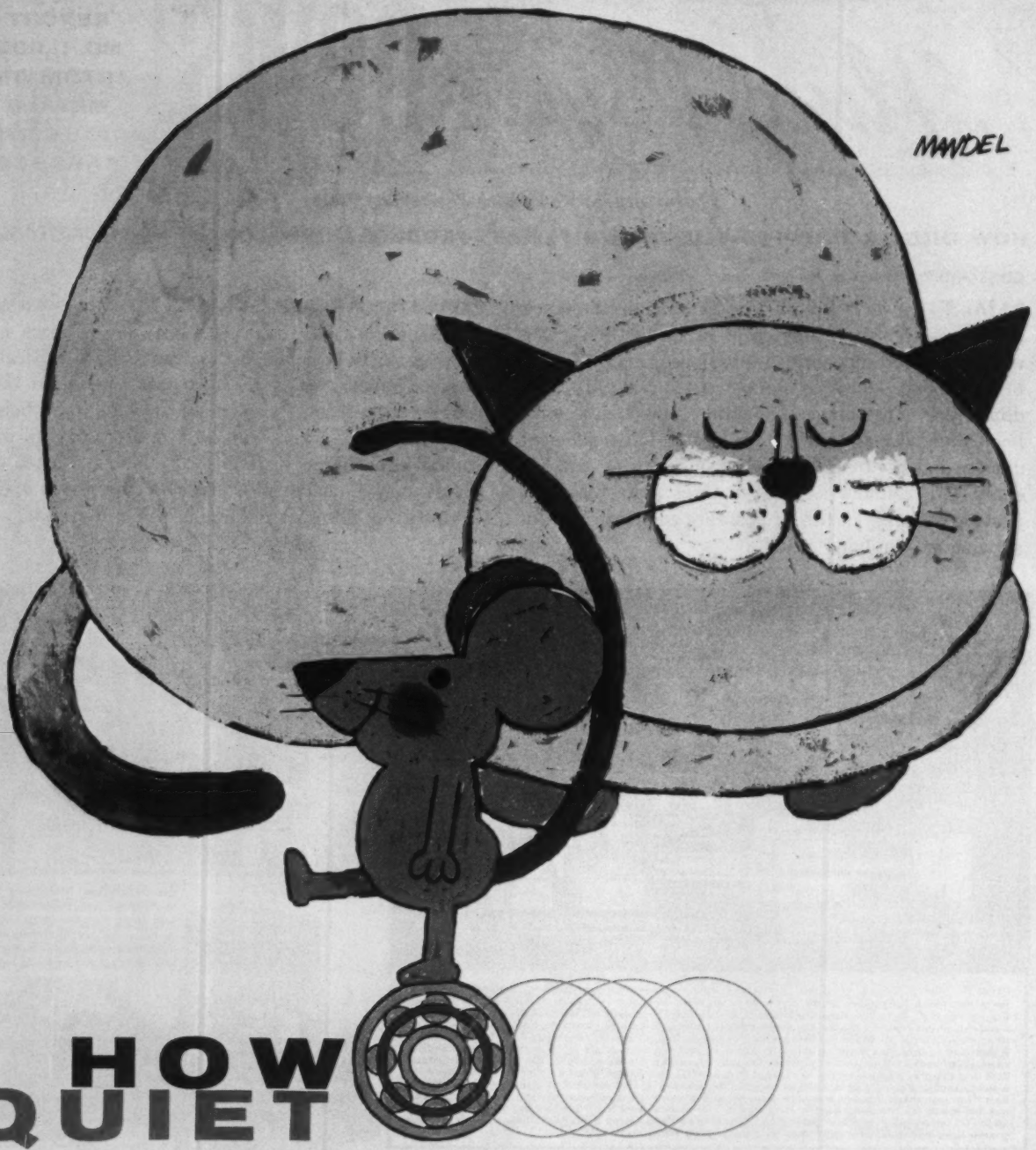
For solutions to YOUR linear or rotary Controlled Motion problems, call the factory-trained Oilgear Application-Engineer in your vicinity. Or write, stating your specific requirements, directly to . . .

THE OILGEAR COMPANY

Application-Engineered Controlled Motion Systems

1572 WEST PIERCE STREET • MILWAUKEE 4, WISCONSIN

Phone: Mitchell 5-6715 . . . Direct Distance Dialing Code 414



HOW QUIET

can a ball bearing be?

Federal Ball Bearings are to be seen, but not heard! Elusive noises are intercepted by inspection engineers at "quiet control" points all along our production line. They want to hear the soft, sweet purr that signifies a perfect bearing, because that's the only kind we'll tolerate. That's why every bearing goes through scores of quality control tests before we send it out. Customers who get these perfect bearings number among the most respected names in American industry. We'd like to include you. Start with our catalog—over 12,000 ball bearing sizes, hundreds of types. Send for it today.

THE FEDERAL BEARINGS CO., INC., Poughkeepsie, N. Y.

Federal

BALL BEARINGS

One of America's largest ball bearing manufacturers

FEDERAL ON FILM—A 16 mm. color sound film takes you through our 400,000 sq. ft. plant. Loaned free. Just ask for it.

Quality . . . the best economy of all

Photo courtesy of J. W. Rex Corp.

To hit the exact qualities you want . . . you need a choice of quenching oils

You can *get by* with just one quenching oil. But you can't always get the *best results* . . . not when you measure quality to a fine degree. Very often, you need a choice.

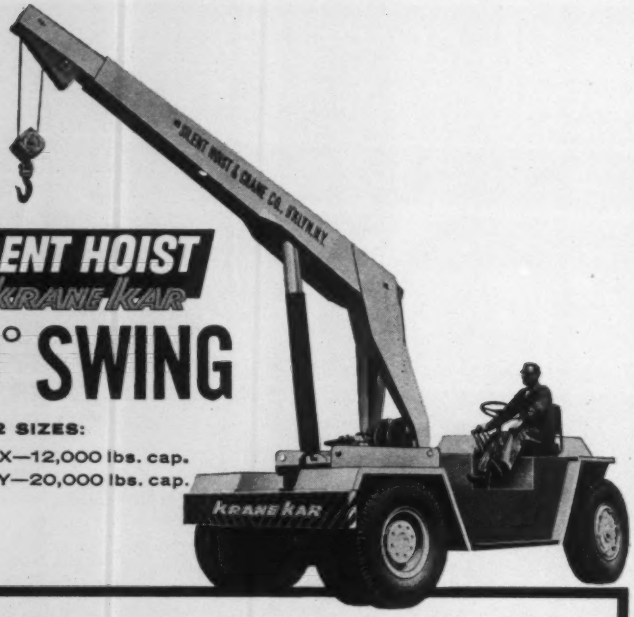
Sun makes quenching oils to reduce cooler-maintenance costs... oils with high antidecomposition qualities . . . oils for fast-quenching operations . . . oils for marquenching . . . and other "specials."

See your Sun representative for help in evaluating your quenching needs. He'll show you how to save money while maintaining quality . . . the best economy of all.

SUN OIL COMPANY, Philadelphia 3, Pa. Department S - 6. In Canada: Sun Oil Company Limited, Toronto and Montreal.

SUNOCO

MAKERS OF FAMOUS CUSTOM-BLENDED BLUE SUNOCO GASOLINES



SILENT HOIST
KRANE KAR

360° SWING

2 SIZES:
MODEL FAX—12,000 lbs. cap.
MODEL FAY—20,000 lbs. cap.

THE LOW COST OF LIFTING WITH...

SILENT HOIST KRANE KAR

360° BOOM SWING—*Now . . . another addition to the famous family of Silent Hoist* **KRANE KAR** *. . . the original Mobile Swing Boom Crane!* **BOOM ROTATION:** *All-Hydraulic 360° continual rotation on heavy-duty double-race ball-bearing turntable.* **BOOM:** *15/22 ft., manual or hydraulic telescoping.* **TRANSMISSION:** *Hydraulic power shift directional in combination with flywheel torque converter.* **STEERING:** *Full time power steering, finger-tip control.* **ENGINE:** *Heavy duty 6 cylinder valve-in head type.* **BOOM TOPPING:** *Horizontal to highest vertical in only 8 seconds.* **BOOM HOISTING:** *Load block 3 parts of line 25 to 55 fpm.* **TIRES:** *Dual pneumatic tires on traction axle for high flotation and extra blow-out protection.* **TOTAL VISION AND SAFETY:** *No obstruction in any position of load or crane; operator fully protected through 360° rotation of boom. Write for complete details in illustrated bulletin #99.*

180° BOOM SWING—*The Standard widely favored All-Hydraulic or Mechanical 180° swing boom crane models. Lifts, carries, and places any load up to 12½ tons. One engine powers the machine for travel and all crane applications—finger-tip control. Front traction wheel drive supports chassis and crane load. 2 geared speeds for hoisting, topping, and swinging. No tail swing—Boom never passes over Operator's head. Write for complete details in illustrated bulletin #79.*

SILENT HOIST
KRANE KAR

180° SWING

6 SIZES:
1¼, 2¼, 5, 10, 12½ tons

SILENT HOIST & CRANE CO. · BROOKLYN 20, N.Y.

CALENDAR
OF MEETINGS

June 13-15, Metal Powder Industries Federation and Metallurgical Society of AIME: International conference on powder metallurgy, Biltmore Hotel, New York. Federation's address: 60 E. 42nd St., New York 17, N. Y. Executive secretary and treasurer: Kempton H. Roll.

June 15-17, American Marketing Association: Annual meeting and exhibit, Leamington Hotel, Minneapolis. Association's address: 27 E. Monroe St., Chicago 3, Ill. Executive director: Vance E. Lockhart.

June 19-21, Alloy Casting Institute: Annual meeting, Homestead Hotel, Hot Springs, Va. Institute's address: 1001 Franklin Ave., Garden City, N. Y. Executive vice president: E. A. Schoefer.

June 19-22, American Institute of Chemical Engineers: Summer meeting, Del Prado Hotel, Mexico City, Mex. Institute's address: 25 W. 45th St., New York 36, N. Y. Secretary: F. J. Van Antwerpen.

June 19-24, American Institute of Electrical Engineers: Summer general meeting, Chalfonte-Haddon Hall, Atlantic City, N. J. Institute's address: 33 W. 39th St., New York 18, N. Y. Secretary: N. S. Hibshman.

June 26-29, Drop Forging Association: Annual meeting, Seignory Club, Papineau County, Quebec. Association's address: 55 Public Square, Cleveland 13, Ohio. Executive vice president: Dwight M. Allgood.

June 26-30, Caster & Floor Truck Manufacturers Association: Semiannual meeting, Equinox House, Manchester, Vt. Association's address: 27 E. Monroe St., Chicago 3, Ill. Executive secretary: Harry P. Dolan.

June 26-July 1, American Society for Testing Materials: Annual meeting and exhibit, Chalfonte-Haddon Hall, Atlantic City, N. J. Society's address: 1916 Race St., Philadelphia 3, Pa. Executive secretary: Robert J. Painter.

July 2-6, National Tool & Die Manufacturers Association: Summer meeting, Banff Springs Hotel, Banff, Alta. Association's address: 907 Public Square Bldg., Cleveland 13, Ohio. Executive vice president: George S. Eaton.

July 10-13, Truck-Trailer Manufacturers Association: Summer meeting, Homestead Hotel, Hot Springs, Va. Association's address: 710 Albee Bldg., Washington 5, D. C. Managing director: John B. Hulse.

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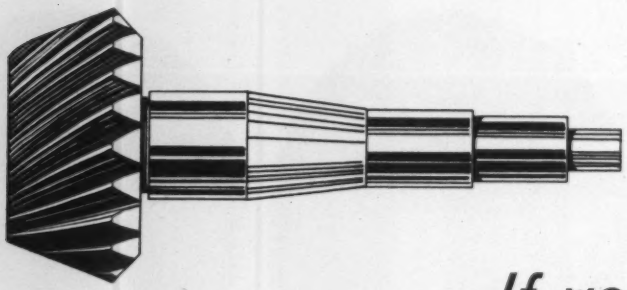
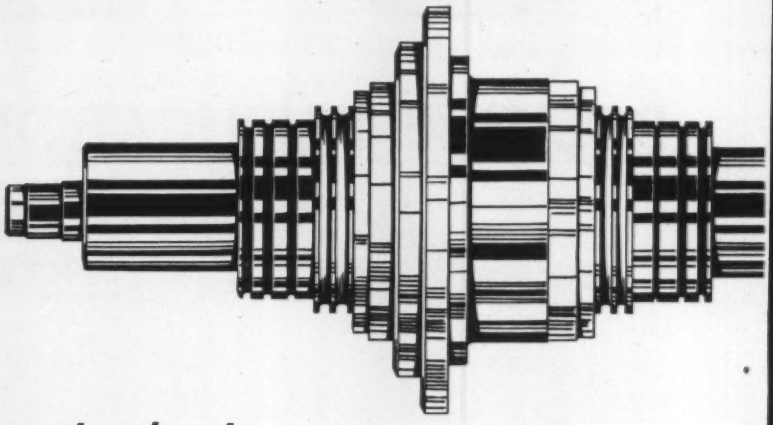
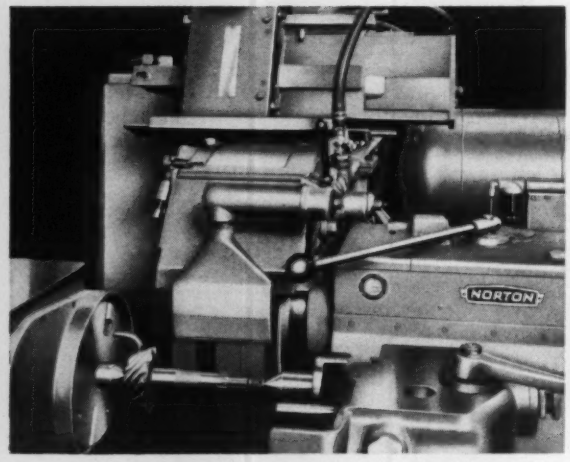


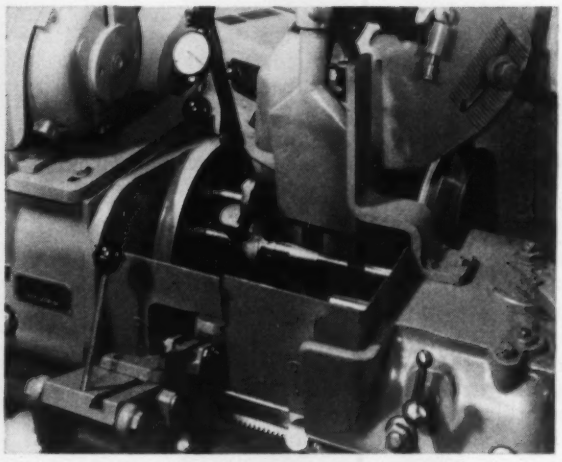
If you grind parts



combine your grinds in NORTON machines...like these



Grinding three stem pinion diameters on a Norton Type CTU Cylindrical Grinder. This multiwheel setup grinds three diameters in a single plunge cut, eliminating the need for separate operations. Norton automatic truing substantially increases the efficiency of multiwheel grinding.



Grinding a steering knuckle on a Norton Type CV-4 Angular Wheelslide Grinder with a dual wheel setup. Norton machines of this type offer unlimited opportunities to save time and effort when grinding several diameters, adjacent radii, and shoulders.

NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Electro-Chemicals — **BEHR-MANNING DIVISION:** Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

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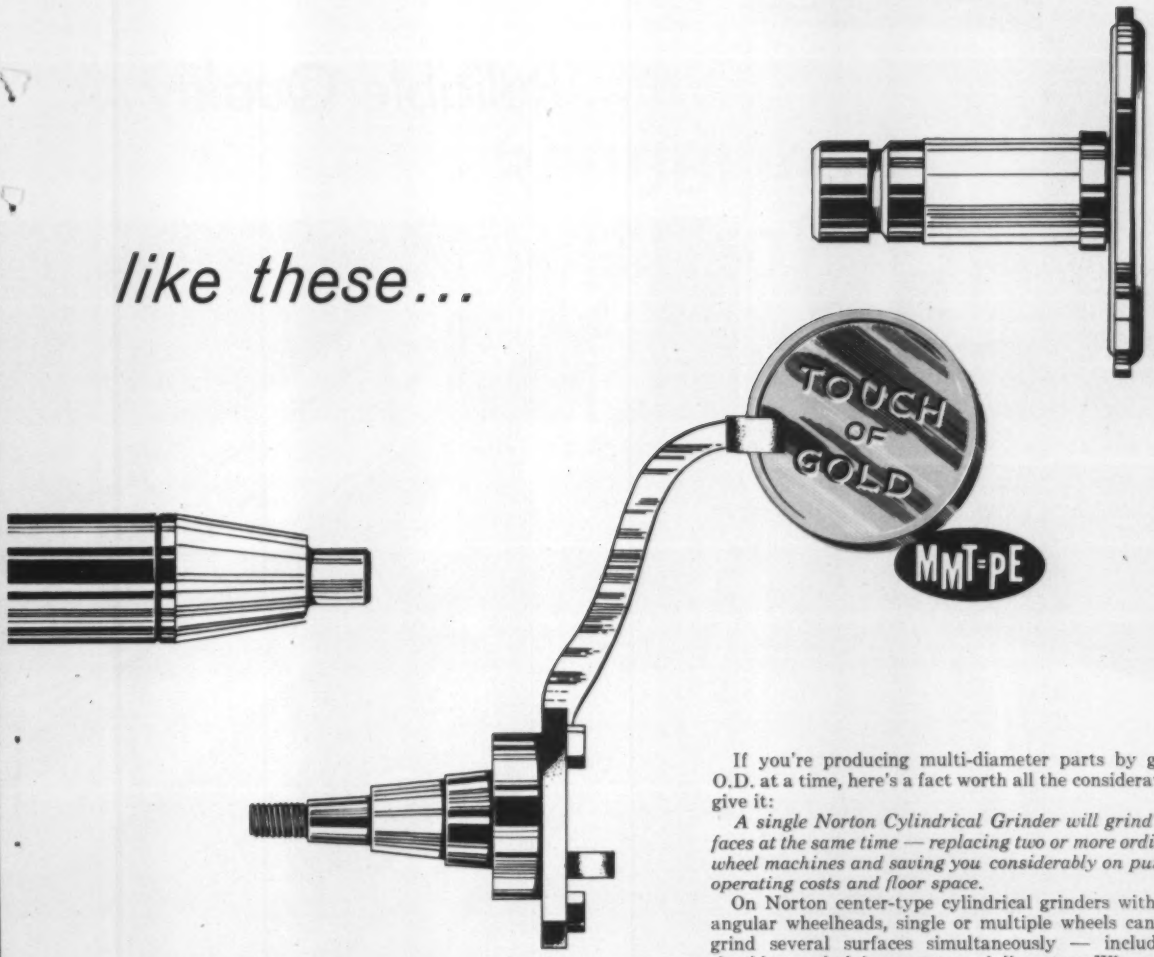

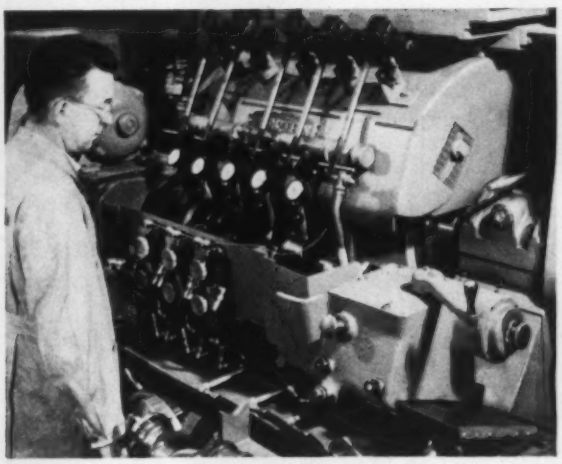

Grinding multiple diameters on a crankshaft, this Norton Type CM-1 Multiwheel Grinder finishes the job in about the same time it would take a conventional machine to grind just one of these diameters. The massive wheel spindle holds a number of 36" wheels, properly spaced, within a wide span of 30".

If you're producing multi-diameter parts by grinding one O.D. at a time, here's a fact worth all the consideration you can give it:

A single Norton Cylindrical Grinder will grind several surfaces at the same time — replacing two or more ordinary single-wheel machines and saving you considerably on purchase costs, operating costs and floor space.

On Norton center-type cylindrical grinders with straight or angular wheelheads, single or multiple wheels can be used to grind several surfaces simultaneously — including tapers, shoulders and plain or contoured diameters. Where wider wheel spacing is required, the heavy duty Type CM-1 Multiwheel Grinder can be used to good advantage for high speed, high production O.D. grinding.

Among the many time-and-money-saving features engineered by Norton for these machines, push-button actuated automatic wheel truing is one of the most outstanding advancements. This device provides close, uniform control of the amount of wheel face removed by the truing diamond, and trues the wheel or wheels either straight or formed, with speed and precision.

Get further facts on how Norton cylindrical grinders are bringing new efficiency and economy to O.D. grinding throughout industry. Your Norton Man, a trained grinding engineer, will be glad to show how these multi-grind, multi-wheel machines can benefit your own production. NORTON COMPANY, Machine Division, Worcester 6, Mass.

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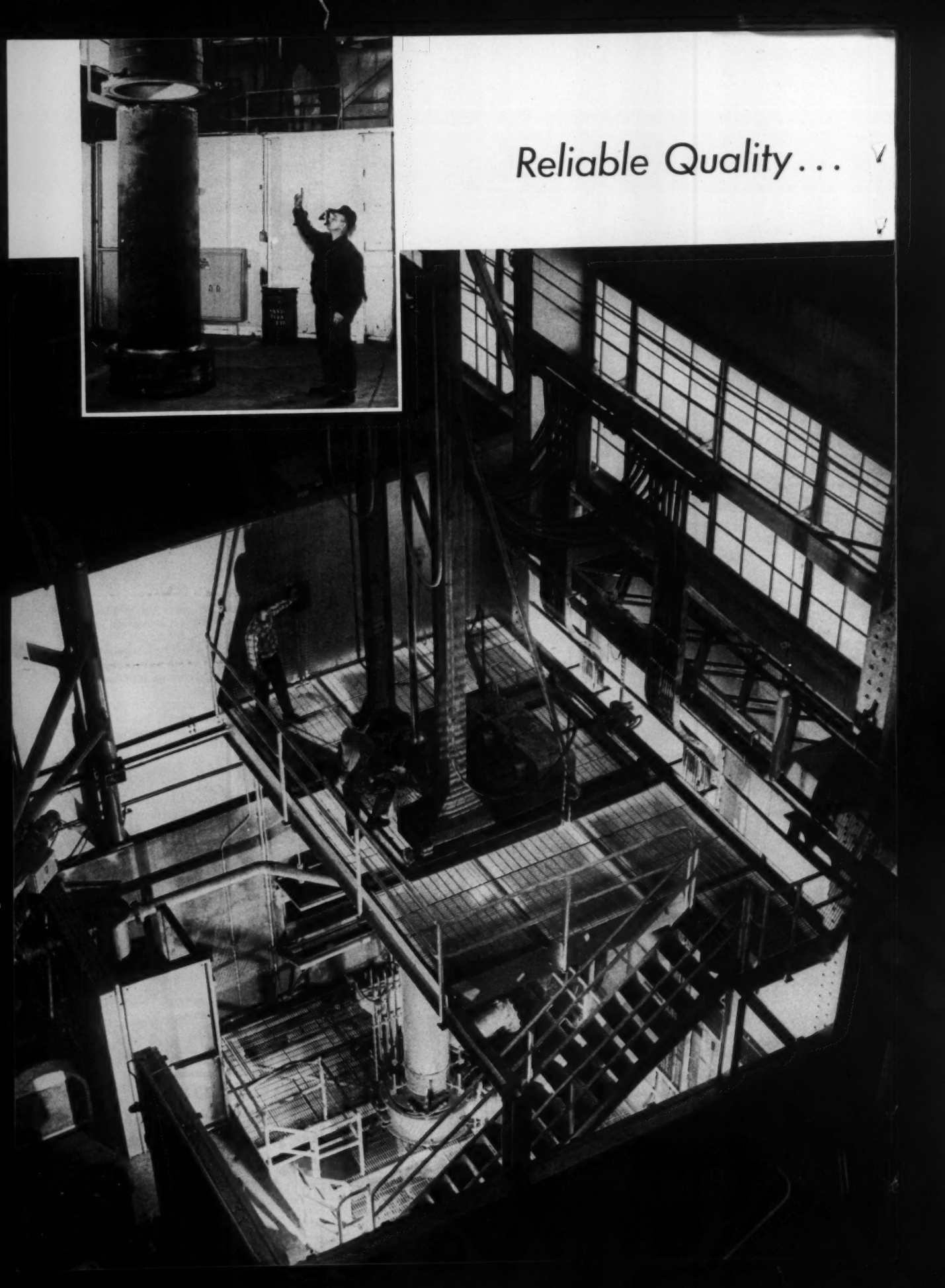
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Republic uses the consumable electrode vacuum-melting process. Metals thus produced offer higher mechanical properties—ductility, tensile strength, and fatigue life. Non-metallic inclusions are reduced in number and size. Testing, certification, job setup, and production costs are reduced.

Our metallurgists and engineers are available to help you select, apply, and process the vacuum-melted metal best suited to your requirements. For complete information, contact your nearest Republic sales office today or return the coupon.

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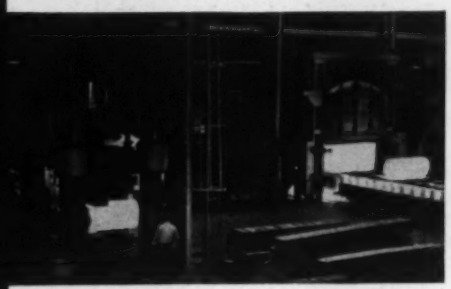
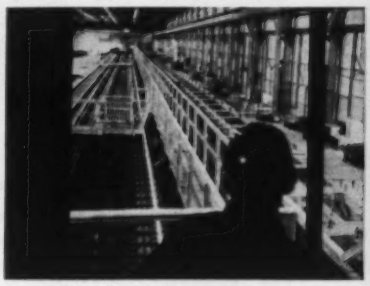
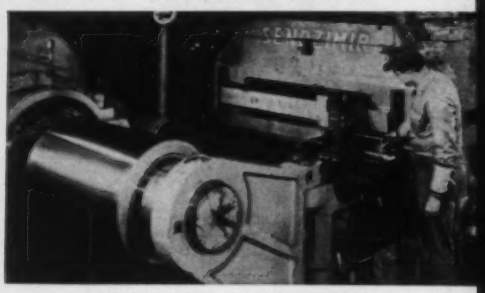


BILLETS—Republic's 3000-ton forging press converts vacuum-melted metals to large billets that are ideal for forged parts manufacture. Segregations associated with dendrite freezing are greatly reduced by the consumable electrode process and further alleviated by the greater hot work reduction ratios permitted by large ingots.



BARS—Vacuum-melted metals are converted into close-tolerance squares, rounds, hexes, and many other shapes on Republic bar mills. Virtually any size can be produced—from ¼″ to 10″ rounds and equivalent footweight sections. These bars offer improved ductility, tensile strength, fatigue life, and resistance to scaling.



SHEETS—Vacuum-melted stainless, titanium, and super alloy steels are converted to light gage sheet and strip on Republic's Sendzimir mills. Large coils up to 48″ (36″ maximum on titanium) wide are produced to close tolerances with excellent finishes and strength-to-weight ratios. Sheets up to 72″ wide can be produced on hand mills.

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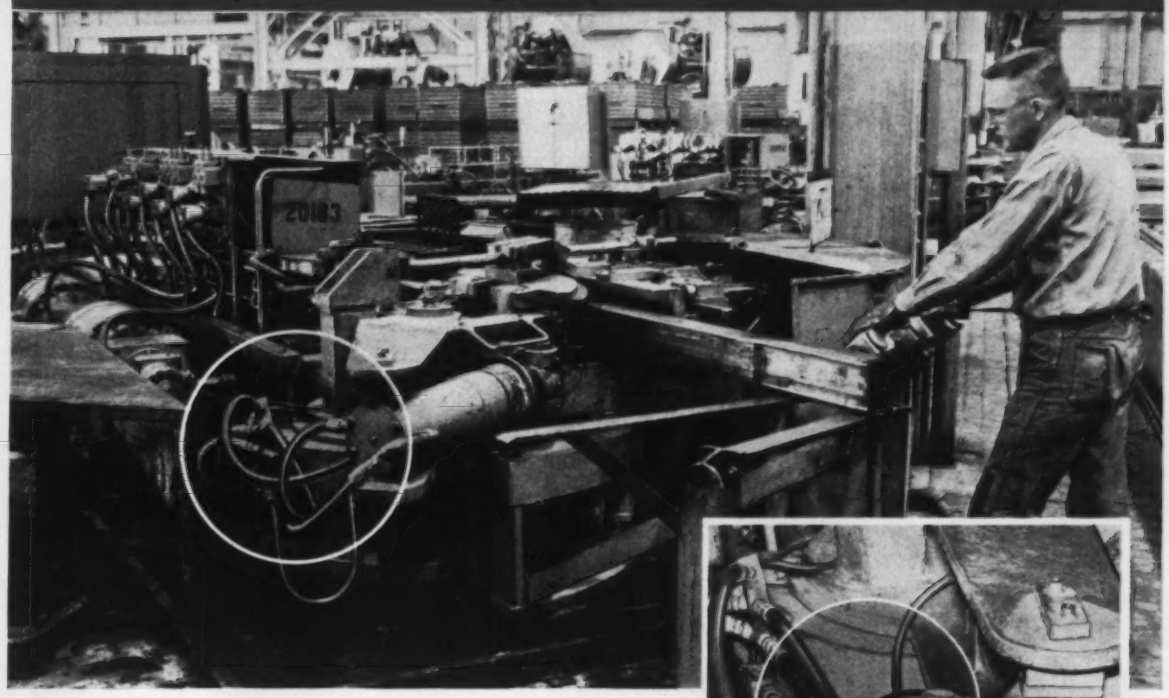
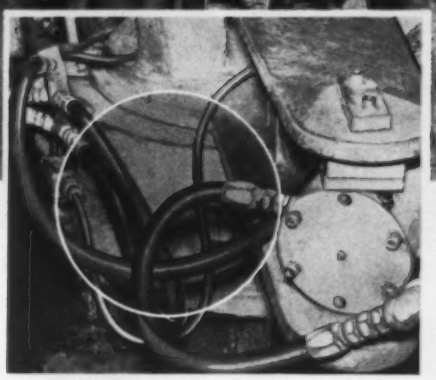
From the job report of a leading plant producing auto frames and stampings



Aeroquip 1508 High Pressure Hose and Reusable Fittings proved as flexible as 2-layer hose and strong as 4-layer hose for a leading producer of auto frames. Installed on clamps of hydraulic benders, Aeroquip Hose undergoes constant flexing and pressure surges of 2200-2500 psi. Results? Aeroquip flexibility and strength have prevented hose failures from causing unnecessary maintenance or costly downtime.

Aeroquip Hose and Reusable Fittings help save time, when infrequent replacement is required. Hose is cut to length, and the replacement made right on the job—no special tools are needed. Fittings can be reused again and again.

Your Aeroquip Distributor is a fluid line specialist. He will give you a copy of our Industrial Catalog No. 204 and show why you are in good hands when you consult with Aeroquip. His telephone number is in the "Yellow Pages" under "Hose."



Aeroquip 1508 Hose reduced maintenance on the clamps of these benders for auto frame rails.

Aeroquip is so easy to use—
Your inventory is just a few feet of hose and a handful of fittings.

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In metal-rolling mills—where minutes of downtime are measured in thousands of dollars—fast, simplified maintenance of main drive motors is critical.

The revolutionary "TOP-FORWARD" twin-drive shown above exemplifies General Electric's continuing emphasis on better design for ease of maintenance. Shaft extension of the rear motor passes *beneath* the forward motor instead of directly over as in conventional designs. This unique drive arrangement allows clear access by overhead crane to all bearings, air-shields and other components of *both motors*.

Shorter over-all length of drive substantially reduces space required and provides cost savings in foundation construction. Improved Class B Insulation system for armatures and fields, utilizing proven resins and compounds, provides greater resistance to heat, moisture and dirt.

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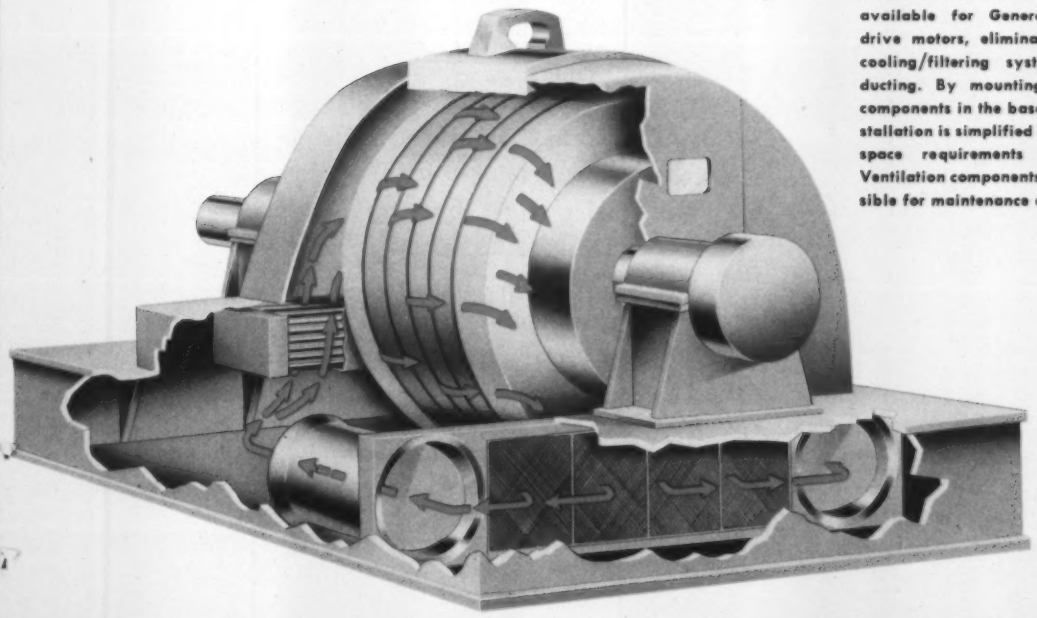

INTEGRAL VENTILATION SYSTEM, available for General Electric main drive motors, eliminates separate air-cooling/filtering system and related ducting. By mounting all ventilation components in the base of the drive, installation is simplified and supplemental space requirements are eliminated. Ventilation components are easily accessible for maintenance and inspection.

Three Reasons General Electric D-c Drives are Best for

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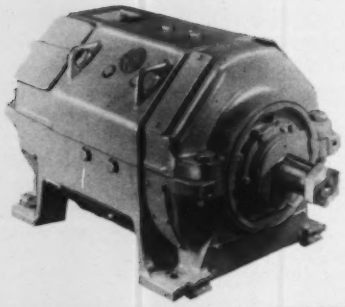
D-c Auxiliary



GENERAL ELECTRIC'S MD-600 ARMORED MOTOR is built to withstand severe shocks, give maximum reliability. Class H insulation provides superior protection—permits greater work capacity.

Designed to exceed the requirements of the most advanced continuous processing systems, General Electric MD-600 series armored mill motors are built to withstand regular exposure to hot scale, steam and corrosive sprays. Improved high temperature insulations have appreciably lengthened motor life.

Designed to meet or exceed AISE standards in all respects, General Electric's armored motor offers unmatched flexibility. This motor can be adapted to fit any of five different ventilation requirements simply by adding or removing standard covers. No other modifications are necessary.

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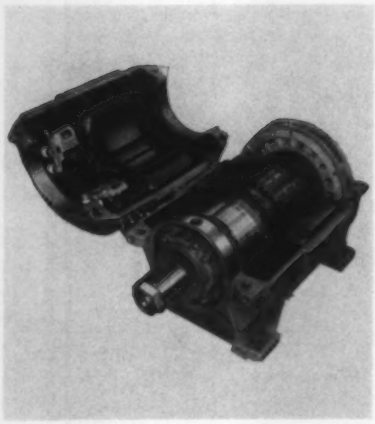
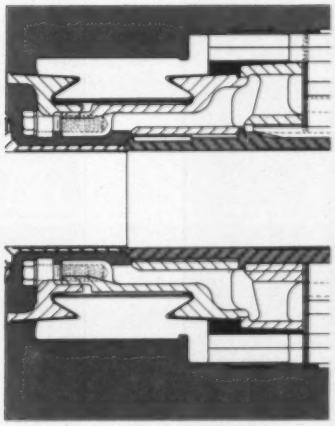
GENERAL ELECTRIC

Meet Demands of Continuous Processing



DESIGNED FOR EASY ACCESS, top half of General Electric MD-600 motor frame swings open nearly 180° to permit fast armature removal. Positioning keys in frame heads facilitate armature alignment.

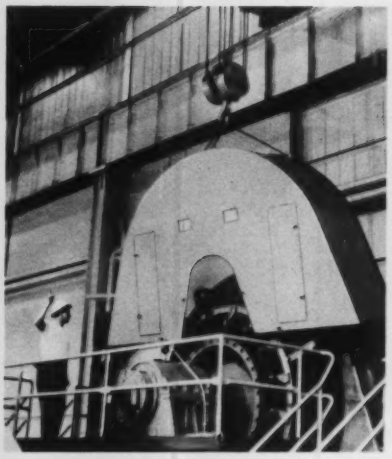


DESIGNED FOR EASE OF MAINTENANCE, the armature on General Electric armored motors is assembled on a steel spider so the shaft can be pressed out without disturbing commutator or windings.

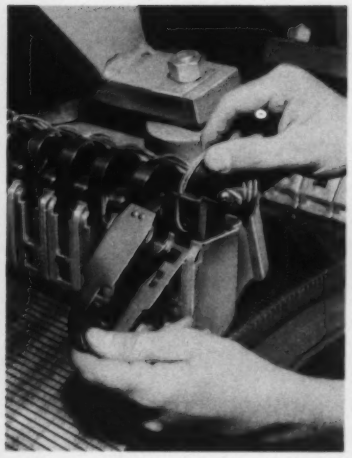
BUILT TO DRIVE HEAVIER LOADS—accelerate, start, stop and reverse faster—MD-600 motors meet toughest demands of automated systems. Integral feet on the endshields allow the armature to stand alone when removed from frame.

Three Reasons General Electric D-c Drives are Best for

3. G-E Drives Give You New Competitive



NEW QUICK-REMOVABLE COVERS use no bolts, permit easy access. Tapered guide pins, attached to "TOP-FORWARD" d-c main drive motor frame, accurately position covers on base and frame. Removal and replacement time is reduced to a minimum.



CONSTANT-PRESSURE BRUSH-HOLDERS eliminate all pressure adjustments, give optimum contact at all times. General Electric brush-holder design permits observation of brush wear. Brush can be replaced in seconds.

DISC-LUBRICATED BEARINGS provide positive oiling during all operating conditions. Self-aligning, cast-steel, babbitt-lined bearings can be removed without disconnecting oil piping—maintenance is simplified.

Automated Production Systems

Advantages to Meet the Challenge of the 60's

Higher processing speeds, tighter production schedules and better product quality are requisites of industrial growth in the coming decade. As continuous processing and automation techniques spread throughout industry, rapid maintenance of basic equipment becomes an increasingly important competitive advantage.

General Electric's simplified-maintenance drive design gives you this advantage plus the high thermal and mechanical limits and improved commutation demanded of automated processes.

Let your G-E Sales Engineer show you how easily new d-c main and auxiliary drives can fit into your modernization plans, improve operating efficiency and help you meet the challenge of the '60's. For descriptive information on d-c motors for heavy industry, write Section 772–9, General Electric Co., Schenectady 5, N. Y. *Large Motor & Generator Dept., Schenectady, N. Y./Direct Current Motor & Generator Dept., Erie, Pennsylvania.*

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D-c Main & Aux. Drives

LINK-BELT SS CLASS DRAW BENCH CHAIN

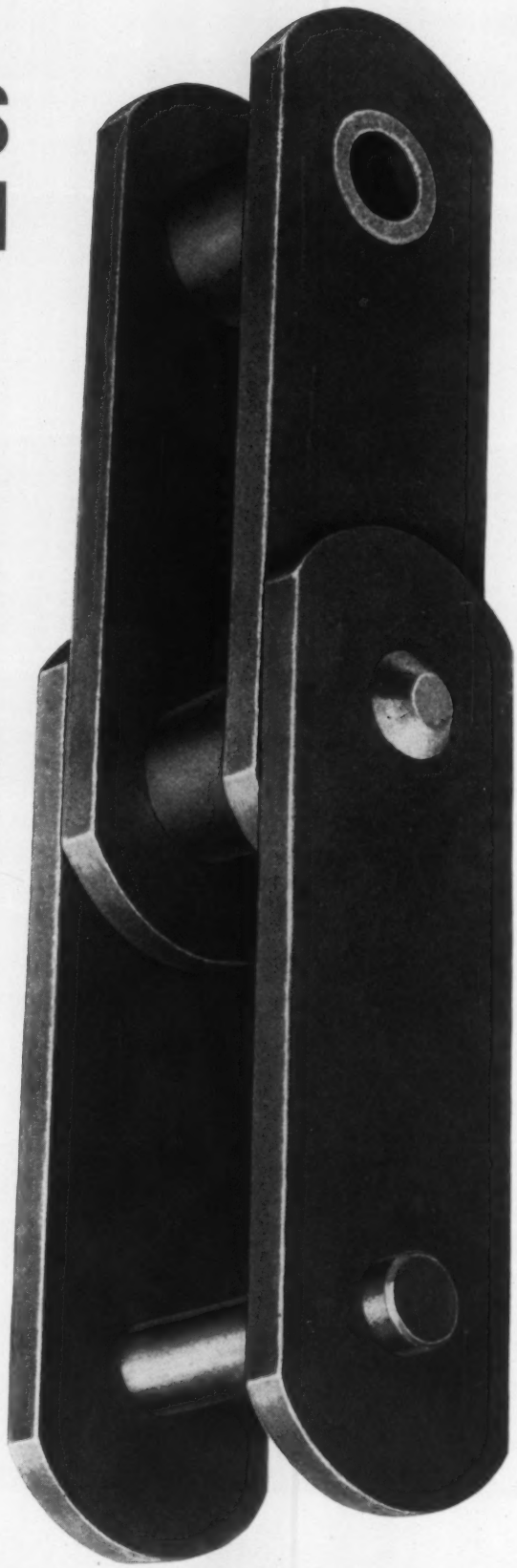
gives longest chain life . . . resists highest chain pull

Link-Belt SS Class draw bench chains won't give in—whether they're used on benches having capacities of 5000 lbs., 100,000 lbs. or greater. Parts are accurately machined, after hardening, by a special process that assures longer chain life on even the highest chain pull applications.

These rugged chains, of all-steel construction, are available in a variety of pitches and strengths to suit any draw bench requirement. Chains, such as the one illustrated, have hardened pins, bushings and sidebars. Pins and bushings are securely locked in the sidebars by controlled press fits. Block type chain, with hardened pins and sidebars, is also available. Pins on this chain are also securely locked in the sidebars by controlled press fits and sprocket contacting surfaces of the block links are accurately machined to assure proper tooth engagement.

For further facts, call your nearest Link-Belt office or stock-carrying distributor, listed under CHAINS in the yellow pages of your phone book. Or write for our new comprehensive Catalog 1050.

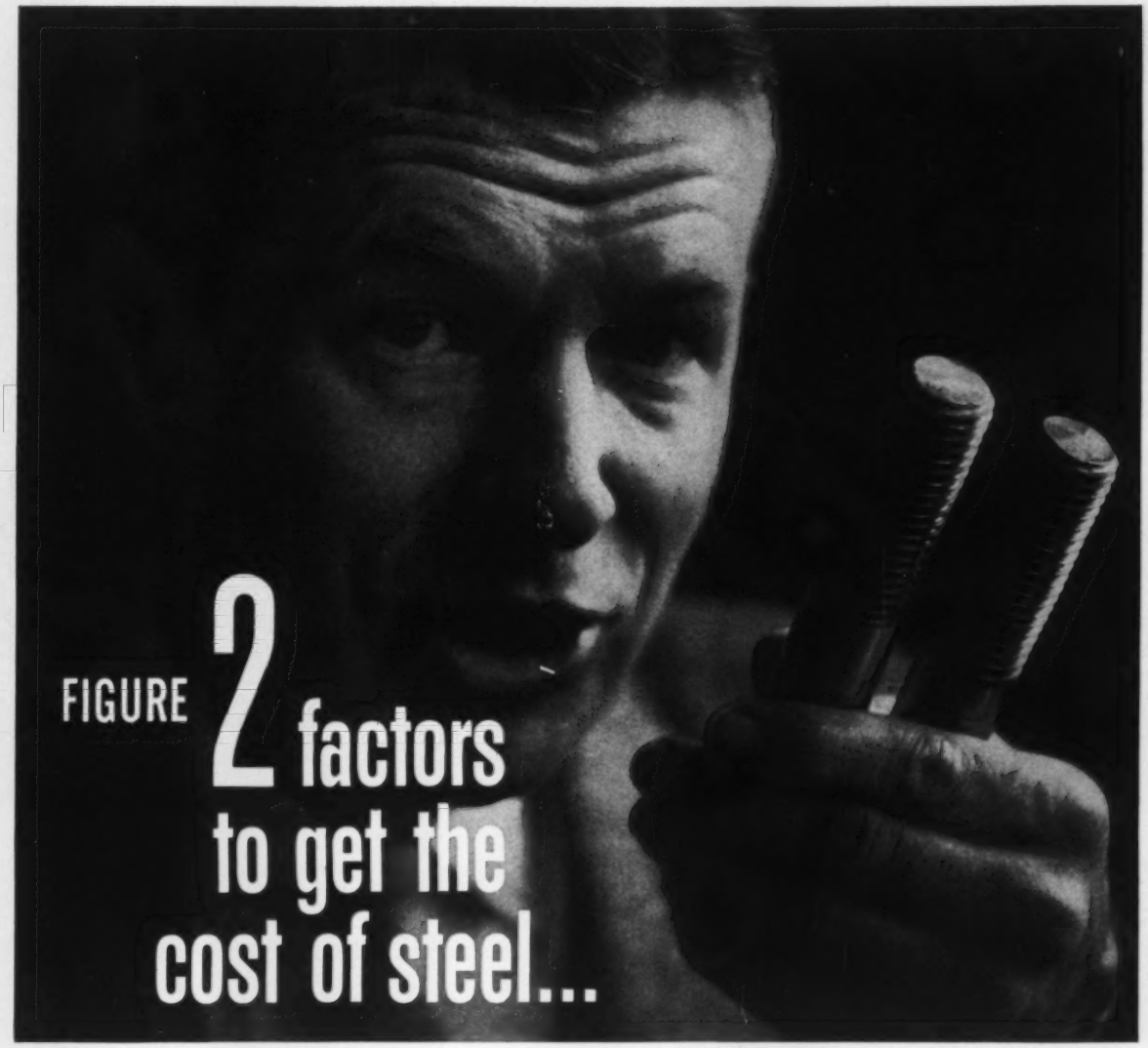
15,067



LINK-BELT

CHAINS AND SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Warehouses, District Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro, (Toronto 13); South Africa, Springs. Representatives Throughout the World.



COST OF POSSESSION and delivered cost!

The high cost of possession may surprise you. It has surprised many a smart, informed steel user.

When your Steel Service Center performs first cutting operations you save operating and capital costs of the equipment it requires. You get steel delivered quickly from stock, ready for use. You save costs of storage and handling. You cut scrap loss and wastage.

There's a nearby Steel Service Center set up to serve you, not only with steel, but with technical know-how.

If you are buying more than three months' inventory because you think it's a bargain, compare *all* of your costs with the cost and *freedom from risk* of buying from your Steel Service Center. For more information, get the booklet, *What's Your Real Cost of Possession for Steel?* from your Steel Service Center. Or write to Steel Service Center Institute, Inc., 540-G Terminal Tower, Cleveland 13, Ohio.

COST OF POSSESSION FOR STEEL IN YOUR INVENTORY

Per ton delivered	
Cost of capital:	
Inventory	
Space	
Equipment	
Cost of operation:	
Space	
Materials handling	
Cutting & burning	
Scrap & wastage	
Other costs:	
Obsolescence	
Insurance	
Taxes	
Accounting	
TOTAL	

COST OF FREEDOM-FROM-RISK STEEL FROM YOUR STEEL SERVICE CENTER

Per ton, cut-to-size, and delivered

TOTAL

STEEL SERVICE CENTER INSTITUTE

...YOUR STEEL SERVICE CENTER

NS SPECIAL WIRE (575,000 psi) WRAPS

In the development of solid-fuel rocket cases, a leading manufacturer fabricated and experimented with welded steel and glass fibers, as well as many steel wire specimens, to find a fuel case material with the most favorable strength-to-weight ratio for fuel case applications.

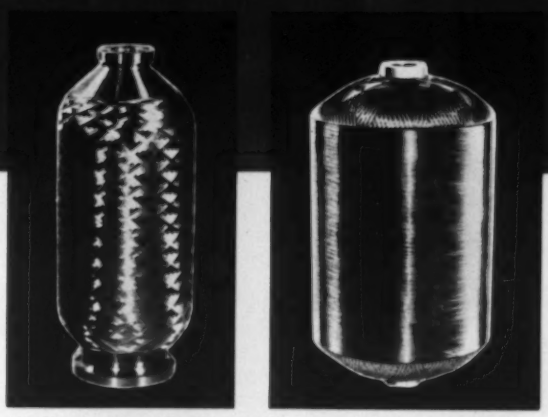
EARLY DEVELOPMENT STAGES—At the outset of their testing program, the rocket manufacturer asked National-Standard to develop .004″ wire with 575,000 psi, the ultimate tensile strength required of steel wire to provide the strength-to-weight ratio needed. The wire was to be made into tapes of uniformly-stressed wires, coated with epoxy resin to separate the wires, and wound over collapsible mandrels to form the fuel case.

NATIONAL-STANDARD ENGINEERS produced .004″ high-carbon steel wire that met every specification, after intensive testing with many types of wire and finishes. Special wire developed by NS met rigid size tolerances, residual twist and controlled cast requirements.

ROCKET FUEL CASES

The end result of NS—customer cooperation was the ability to produce wire-wrapped rocket cases with very high hoop stress and lower cost than those being produced by other methods. And the fuel case manufacturer is able to provide maximum case-to-case reliability.

EXPERIENCED ENGINEERING HELP of this kind is available to you from National-Standard to meet special or unique high-quality wire applications. Write for additional information to National-Standard Company, Niles, Michigan.



WIRE-WRAPPED ROCKET CASES are wound over collapsible mandrels using a number of strands of very high strength, small diameter wire formed into tapes.

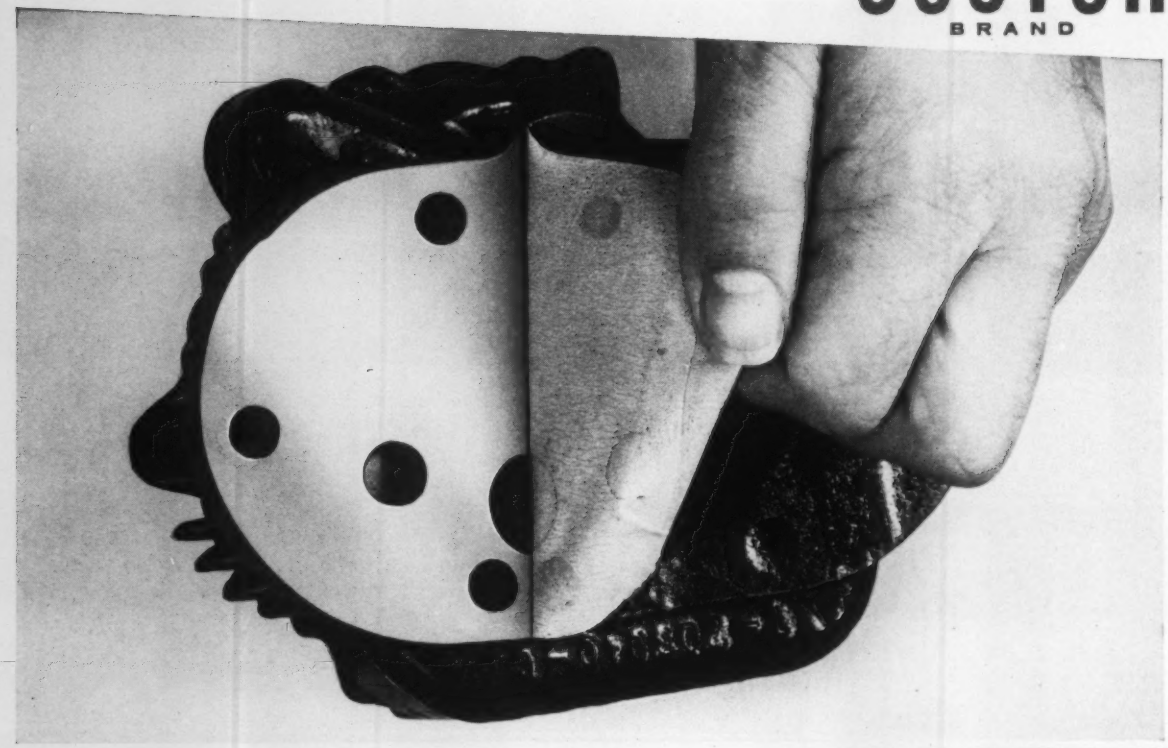
NS
NATIONAL-STANDARD COMPANY

Manufacturer of Specialty Wire and Metal Products

NATIONAL-STANDARD COMPANY

Niles, Michigan

SCOTCH
BRAND



TAPEnology . . . industry's newest cost-cutting tool

GET PERFECT PAINT JOBS EVERY TIME WITH DIE-CUT MASKS OF TAPE

Cover and protect parts with die-cut masks of "SCOTCH" BRAND High-Heat Masking Tapes during spraying and baking cycles. These economical die-cut masks, shaped to pattern of part, save masking time, labor, and materials—give positive placement for faster, neater finished work.

"SCOTCH" High-Heat Masking Tape's excellent adhesive quality holds fast at bake temperatures up to 350°F—results in clean, sharp-line paint jobs every time—yet tape peels off easily when finished and leaves no residue.

Die-cut shapes of "SCOTCH" Masking Tapes are readily available through your local "SCOTCH" BRAND Tape printer-convertor.

What's your problem? With die-cut masks your 3M representative can help you solve not only painting problems but many others from machining to storage and shipment. Ask your nearest "SCOTCH" BRAND Tape Distributor or write: 3M Company, 900 Bush Ave., St. Paul 6, Minnesota.

When tape costs so little, why take less than "SCOTCH" Brand?

"SCOTCH" IS A REGISTERED TRADEMARK OF 3M CO., ST. PAUL 6, MINN.
EXPORT: 99 PARK AVE., NEW YORK 16. CANADA: LONDON, ONTARIO.

MINNESOTA MINING AND MANUFACTURING COMPANY
. . . WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

SCOTCH BRAND
SCOTCH BRAND
SCOTCH BRAND
SCOTCH® BRAND
SCOTCH BRAND

Photo Courtesy Ray Mines Division, Kennecott Copper Corporation

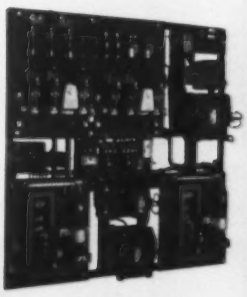
FOR EVERY APPLICATION, THERE'S ONE CRANE OUTSTANDING...

IN COPPER SMELTERS: Fast, safe, precision control is essential in a converter aisle like this. This 60-ton P&H crane is equipped with the finest a-c crane control yet designed — P&H Electronic Stepless Control and Magnetorque electro-magnetic braking.

Here, as in every P&H crane installation, P&H engineers have taken all factors affecting performance into consideration. Exact requirements of this converter-aisle installation have been carefully integrated into the overall design.

If this kind of custom engineering makes sense to you for your operation, why not send for more information? Write for bulletin C-42, Dept. 118, Harnischfeger Corporation, Milwaukee 46, Wis.

Heart of the P&H Electronic Stepless Control is this a-c electronic hoisting-lowering control panel. With this modern electronic control on a three-motor crane, as many as 244 electrical contacts are eliminated. Speed-load characteristics of Electronic Stepless Control far exceed any other conventional a-c or d-c controlled crane!



P&H
OVERHEAD CRANES

HARNISCHFEGER
Milwaukee 46, Wisconsin

HERE'S A HOIST WITH A "SENSE OF TOUCH"

This P&H two-speed hoist is perfect for spotting the massive, but delicate, head of a 2-million volt industrial x-ray machine. There's a high speed for quick movement . . . and a slow speed for sensitive, hairline placement. The control is responsive and sure, permitting the operator to literally "feel" his load into position.

P&H Balanced Design Hevi-Lift hoists are engineered to provide just this kind of "no-compromise" performance. Every part of these hoists — including the 24-volt push-button control — has been matched or balanced with every other part for maximum strength, temperature, and performance characteristics. As a result, Balanced Design Hevi-Lifts provide greater accuracy of control under all load conditions, stand up longer under heavier duty cycles — with less maintenance — than any other hoists made today!

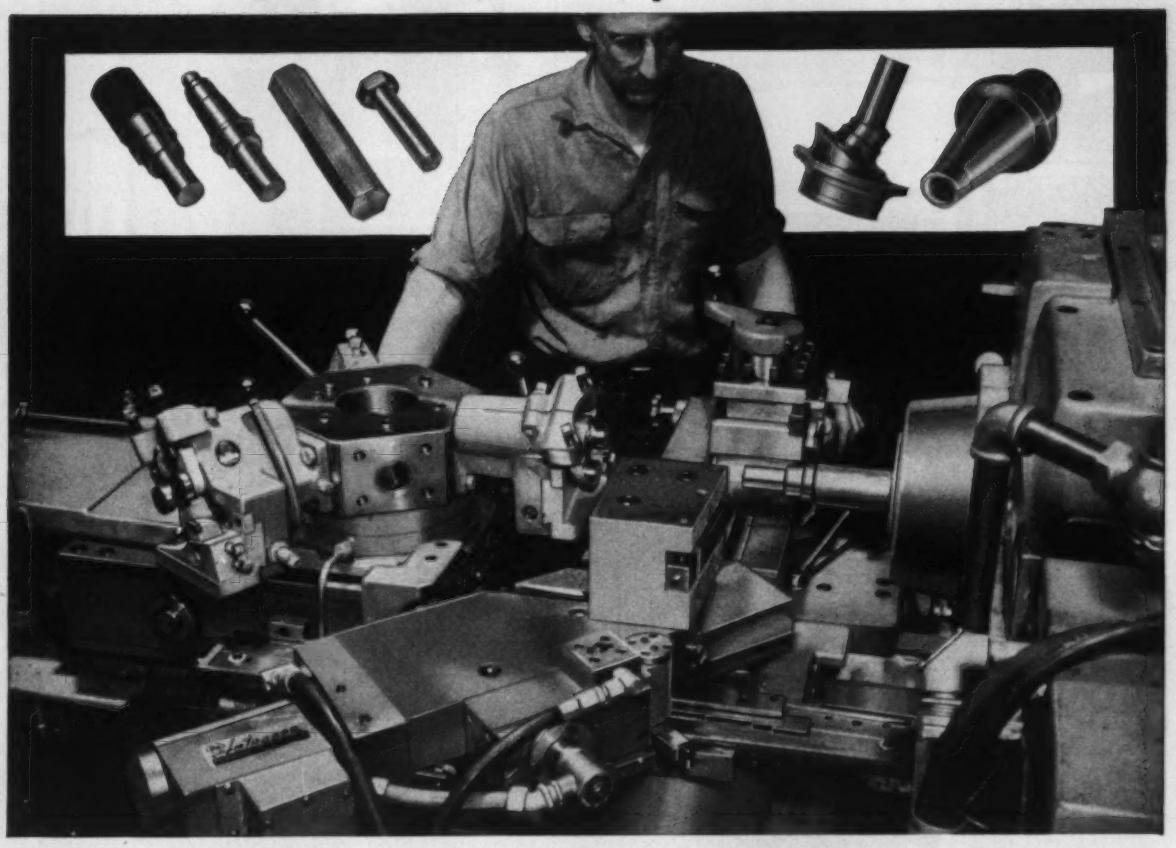
Find out more about P&H Balanced Design hoists. Available in standard single- or two-speed models, to fit your particular need. Call your local P&H hoist distributor, or write for bulletin H-55, to Dept. 224, Harnischfeger Corporation, Milwaukee 46, Wisconsin.

P&H
HEVI-LIFT HOISTS

HARNISCHFEGER
Milwaukee 46, Wisconsin

Photo courtesy General Electric Company, X-Ray Department

Want to cut costs on parts like these?



Here's how tracing will help you save

The simple, basic setup shown above handles nearly 300 different parts for a well-known manufacturer of drive line components. All work is performed on one Gisholt MASTERLINE No. 4 Ram Type Turret Lathe with a JETracer on the rear of the cross slide. Standard tools on the hex and square turrets are used to face, chamfer and reduce the stock while the JETracer finishes all diameters, steps, blends and radii. The 6⅜"-long, 2"-diameter stepped shaft (above at left) is typical and is completed in two operations with total f.t.f. time only 4.95 minutes.

Here are just a few things the JETracer can do for you:

- **Shorten setup and change-over time**
- **Simplify machining and eliminate operator errors**
- **Save cost of form tools, multiple tool blocks and holders**
- **Reduce inspection time (only one length and one diameter need checking)**
- **Minimize or eliminate secondary operations (through finer finish, greater accuracy)**
- **Increase production through automatic machining of complex surfaces**
- **Free operator to handle extra units or perform other work**

Gisholt has developed a complete line of JETracers for use with ram and saddle type turret lathes, automatic turret lathes and single-spindle chucking lathes. These include rear cross slide, turret and independent slide mounted units, single or multi-pass types. *All are designed to operate at full capacity of the machines to which they are applied, without limiting machine functions or restricting the use of standard tools.*

You'll want to see for yourself how the JETracer adds flexibility, speeds operations and cuts costs on standard and problem parts. Send the coupon today for your free copy of the new JETracer catalog, or call your Gisholt Representative for complete information.

GISHOLT MACHINE COMPANY
Madison 10, Wisconsin

ASK YOUR GISHOLT REPRESENTATIVE ABOUT FACTORY-REBUILT MACHINES WITH NEW-MACHINE GUARANTEE

Gisholt Machine Company
1217 E. Washington Ave.
Madison 10, Wisconsin

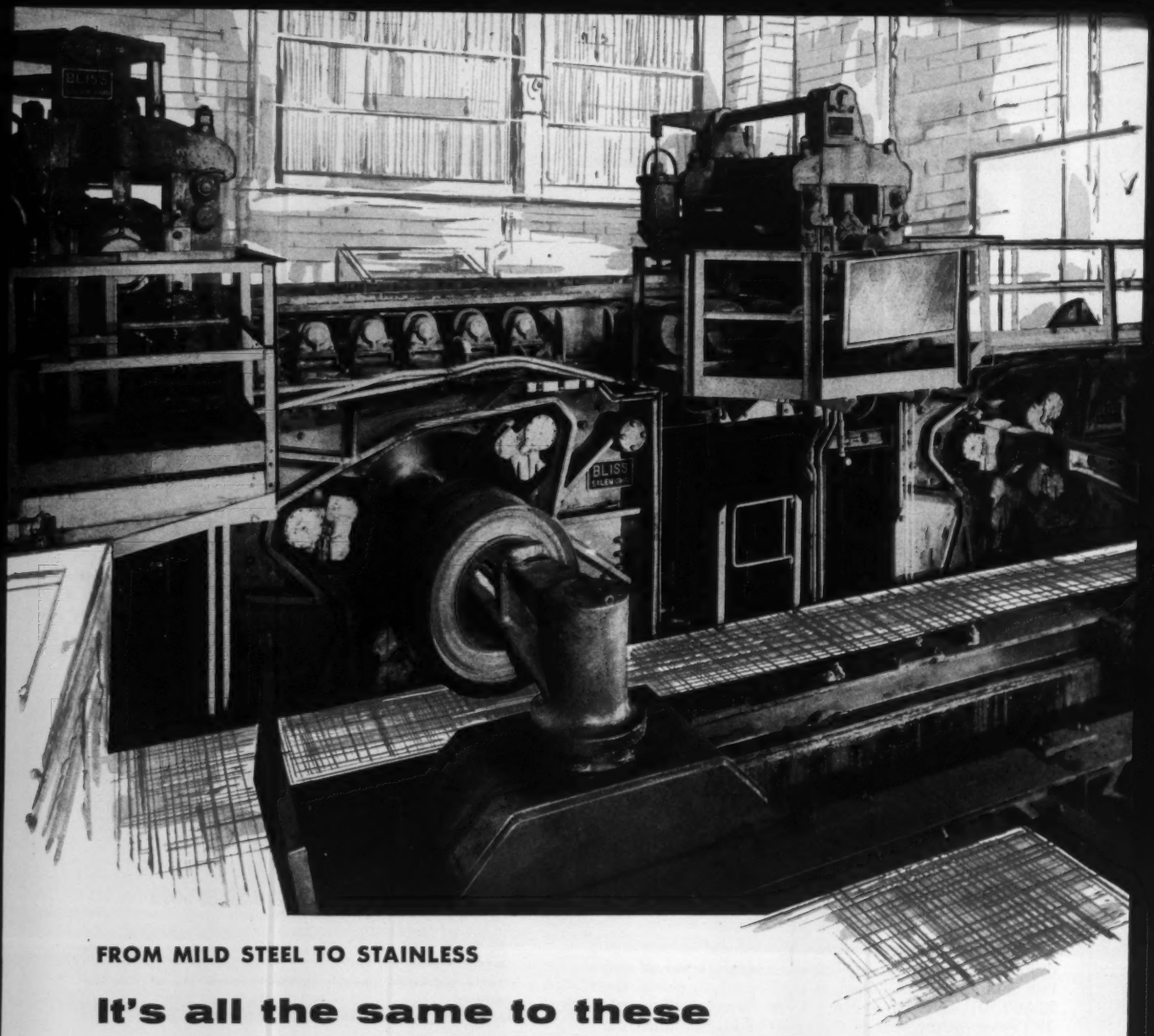
Please send a copy of the new Gisholt JETracer catalog.

Name..... *Title*.....

Company.....

Street address.....

City..... *Zone*..... *State*.....



FROM MILD STEEL TO STAINLESS

It's all the same to these two Bliss coilers at Armco

These smooth-running Bliss downcoilers on the new 56" hot strip mill at Armco Steel Corporation's Butler, Pa. Works, coil everything from flexible mild steel to tough, springy stainless steel strip. Bliss coilers, with their expanding mandrels and positive wrapping action were used because of the variety of gages and alloys to be put through the new mill. In the Bliss design, the mandrel keeps the strip in tension during coiling; wraps a tight, smooth-edged coil without surface scratches or marks. Blocker rolls retract as soon as leading end has been snubbed on the mandrel, and don't move in again until the trailing end is coming through the pinch rolls.

Besides the two downcoilers, Bliss' Rolling Mill Division designed and built the 100-yard-long runout table as another contribution to the Butler Works' handsome new hot strip line. For other examples of Bliss engineering for the ferrous and nonferrous industries, why not write for a free copy of the new profusely illustrated 84-page Bliss Rolling Mill Brochure, Bulletin 40-B? It describes the operation of Bliss mills and auxiliary equipment.

BLISS
SINCE 1857

Bliss is more than a name... it's a guarantee

E. W. BLISS COMPANY, Rolling Mill Division, Salem, Ohio

Subsidiary: The Matteson Equipment Company, Inc., Poland, Ohio

On-the-spot deliveries of ALCOA ALUMINUM FASTENERS!

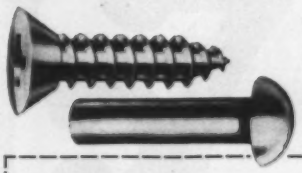
Need aluminum fasteners fast? That's why there's a local distributor of Alcoa® Aluminum Fasteners in your Yellow Pages. That's why he maintains full stocks of Alcoa Aluminum bolts, nuts, rivets, machine screws, wood screws, sheet metal screws, washers—anything you need in standard types and sizes. That's why you can telephone *any* time and get quick delivery, unsurpassed service.

You'll save time. You'll save money—lower production costs. Alcoa Aluminum Fasteners offer many advantages. They're corrosion resistant, won't discolor the finished product. They're free of burrs, with full threads. They're made in fully heat-treated, high-strength alloys. You get full count —exactly what you order.

You can prove it easily. Call your local Alcoa distributor now! If you'd like more data, and samples, just mail the coupon at right.

ALCOA ALUMINUM

ALWAYS FASTEN ALUMINUM WITH ALCOA ALUMINUM FASTENERS



For exciting drama watch "Alcoa Presents" every Tuesday, ABC-TV, and "Alcoa Theatre" alternate Mondays, NBC-TV

Aluminum Company of America
2001-F Alcoa Building, Pittsburgh 19, Pa.

Please send me complete specification data and samples of Alcoa Aluminum Fasteners.

NAME_____ TITLE_____

COMPANY_____

STREET ADDRESS_____

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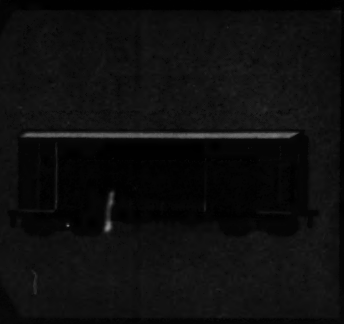
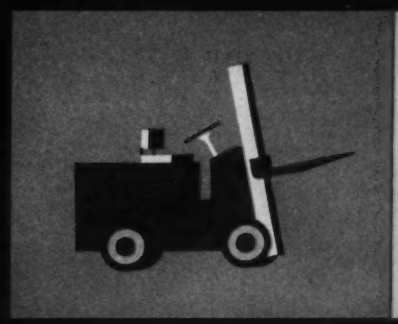
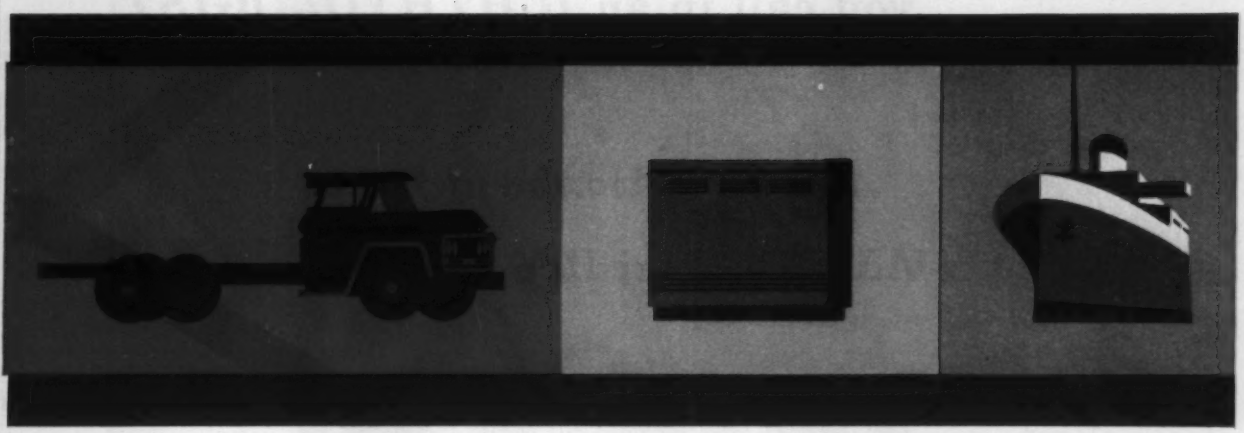
DESIGN FOR LESS WEIGHT AND LONGER LIFE IN YOUR PRODUCT WITH

N-A-X HIGH-TENSILE





STEEL



You can design light weight, longer life, and economy into your products by including N-A-X HIGH-TENSILE in your plans and specifications. This versatile, corrosion-resisting, low-alloy, high-strength steel has many attractive features of special value to designers and manufacturers. For example:

- It is 50% stronger than mild carbon steel.
- It offers superior resistance to atmospheric corrosion.
- It has high fatigue life and great toughness.
- It has greater resistance to abrasion or wear.
- It has great paint adhesion, with less underfilm corrosion.
- It is readily welded by any process.
- It is stable against aging.
- It polishes to a high luster at minimum cost.
- It can be cold formed readily into difficult stampings.

With its many diversified applications in modern metal design, it will pay you to investigate N-A-X HIGH-TENSILE for savings in weight, in production time and for longer product life. A thoroughly competent metallurgical service organization is available to work with you on any application problem you may have. Write, wire or phone Product Development Department, Great Lakes Steel Corporation, Detroit 29, Michigan.

N·A·X
HIGH-TENSILE STEEL

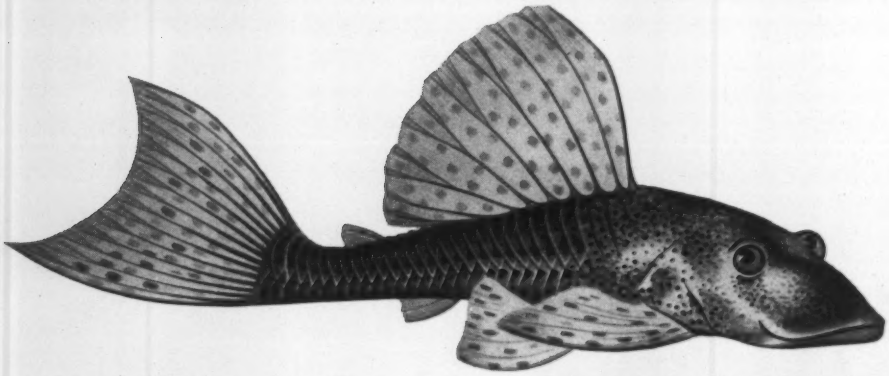
A PRODUCT OF

GREAT LAKES STEEL

Detroit 29, Michigan

Great Lakes Steel is a Division of **NATIONAL STEEL CORPORATION**

To identify a strange fish...



you call in an *ICHTHYOLOGIST*

(specialist in fish life)

to cut production costs...

you call in *LINCOLN*

(specialists in arc welding)

BECAUSE of high operating costs a Maryland barge builder had trouble meeting competitive prices. The LINCOLN Field Engineer recommended a semi-automatic "Squirt" welder. On heavy plate it was four times faster and reduced overall costs due to reduced plate preparation and cleaning time.

As a matter of fact, right there is a good reason for doing business with LINCOLN. Cost reduction is a sort of religion at LINCOLN where production costs have dropped as much as 50% in the last 20 years. It's the result of LINCOLN'S world-famous cooperation between employees and management where everybody gets paid according to his own contribution to the company's goal—superior products and service to you at continually decreasing costs.

That's why we say it's a good idea to do business with LINCOLN where arc welding is a specialty and cost reduction comes to you as a "plus" at no charge.

To learn how LINCOLN can be of service to you, write today

THE LINCOLN ELECTRIC COMPANY
Dept. 2910 • Cleveland 17, Ohio

LINCOLN WELDERS

REEVES Vari-Speed Motodrive

packed with new flexibility . . . broader production use

Now available in this compact design, Reeves Vari-Speed Motodrives deliver 2:1 through 10:1 speed variation, 1.8 through 4660 rpm . . . ¼ to 20 hp.

The infinitely variable output speeds meet almost every production need.

You can get these drives with output shaft on same or opposite side of the motor; vertical, 45°, horizontal or trunnion models; no reducer, and single, double or triple stage reductions . . . hundreds of space saving assemblies. Reeves provides a full range of modifications, accessories, and manual, remote or automatic controls. G-1639

Product of the combined resources of Reliance Electric and Engineering Company and its Master and Reeves Divisions

RELIANCE ELECTRIC AND ENGINEERING CO.

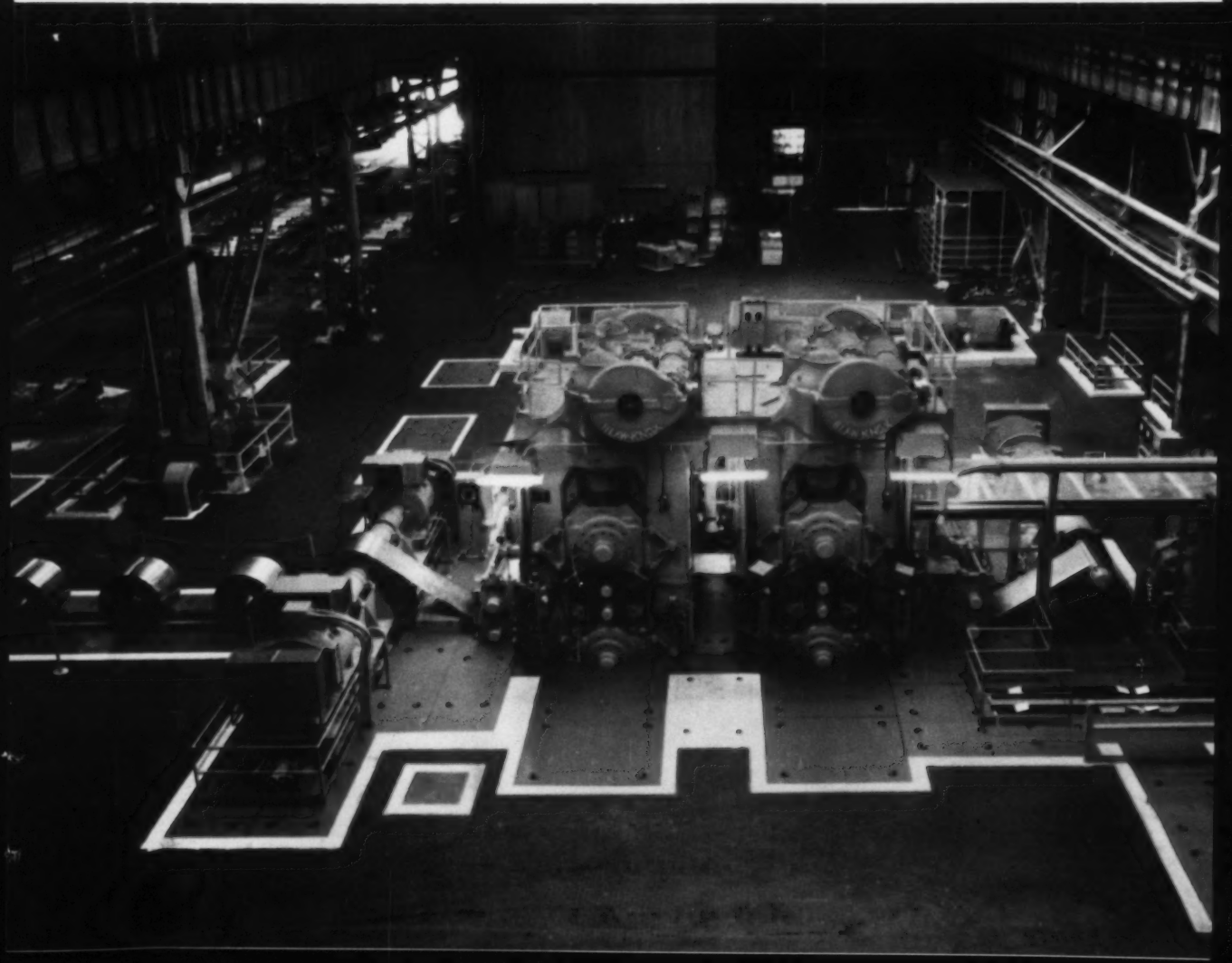
DEPT. 46A CLEVELAND 17, OHIO
Canadian Division: Toronto, Ontario
Sales Offices and Distributors in Principal Cities

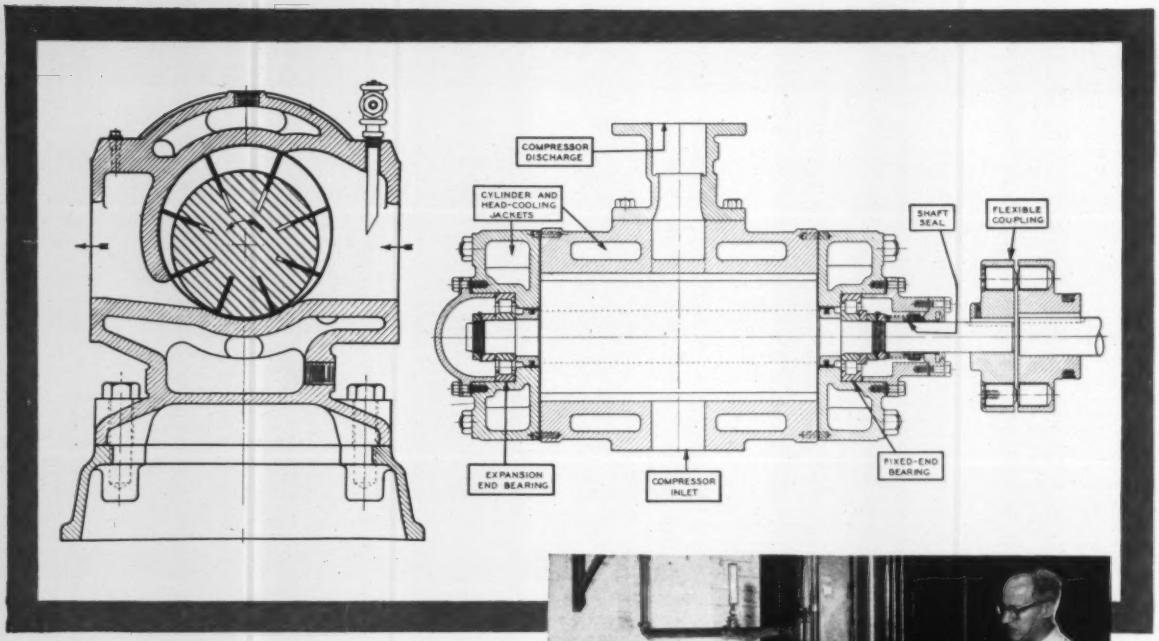
Duty Master A-c. Motors, Master Gearmotors, Reeves Drives, V★S Drives, Super 'T' D-c. Motors, Generators, Controls and Engineered Drive Systems.

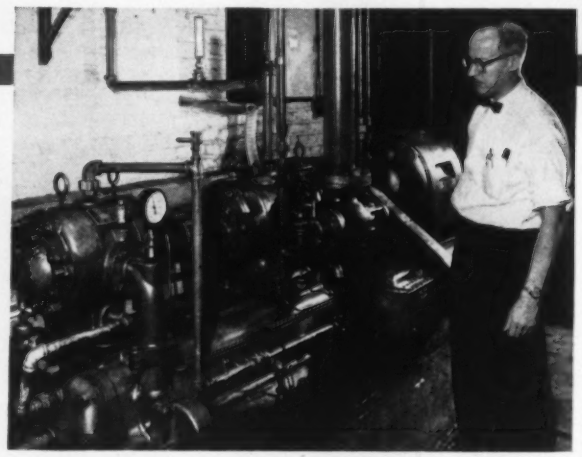
BLAW-KNOX

Blaw-Knox designs and builds a full range of two high and four high Temper Mills for integration into sheet, strip, and tin plate processing operations. Blaw-Knox equipment for the metals industry includes complete rolling mill installations and auxiliary equipment for ferrous and non-ferrous metals, sheet and strip processing equipment, electrolytic tinning, annealing, and galvanizing lines, seamless pipe and tube mills, draw benches, and cold draw equipment, Blaw-Knox Medart cold finishing equipment, iron, alloy iron and steel rolls, carbon and alloy steel castings, fabricated steel plate or cast-weld design weldments, steel plant equipment, and heat and corrosion resisting alloy castings. Blaw-Knox Company, Foundry and Mill Machinery Division, Blaw-Knox Bldg., 300 Sixth Ave., Pittsburgh 22, Pa.

19- and 53-inch x 48-inch high speed 2-stand Temper Mill.







Hard service never affected this Fuller rotary's original output—230 cfm. of air at 90 lb. G., reports Mr. Schott, chief engineer, Thomas C.Wilson, Inc., Long Island City, N.Y.

FULLER ROTARY COMPRESSOR RUNS 13 YEARS WITHOUT DOWNTIME

A Fuller rotary at Thomas C. Wilson, Inc. got its first maintenance shutdown recently, for renewal of roller bearings and rotor vanes—after running without downtime since 1945.

4 years of 24-hour service. The Wilson plant makes tube cleaning equipment, tube expanders and portable pneumatic tools, and so makes heavy daily demands on shop air. For the first four years, three-shift operation kept the Fuller rotary running round the clock. Since 1949, it's been working eight-hour shifts.

Simple design means trouble-free service. Besides bearings, the only moving parts in a Fuller vane-type rotary compressor are the cylinderical rotor and the blades. These compensate for wear automatically. Cylinder head slips off, permitting blade and bearing inspection in a matter of minutes.

Compact and vibration-free. Direct-drive system saves space. Simple, rugged design gives constant service without extensive supervision. Thus, Fuller rotaries can be installed out-of-the-way—on upper floor, on balconies, in basement corners, using low-cost, light-weight foundations.

1189
C-340

Write today for detailed information on the full line of Fuller rotary compressors for in-plant services, gas gathering, and industrial refrigeration.

FULLER COMPANY GENERAL AMERICAN TRADE MARK

FULLER COMPANY
160 Bridge St., Catasauqua, Pa.
Subsidiary of General American Transportation Corporation
Offices in Principal Cities Throughout the World

Fuller
....pioneers in harnessing AIR

PIONEERS OF HIGH-EFFICIENCY VANE TYPE ROTARY COMPRESSORS SINCE 1930

"ALCOA ALUMINUM SCREW MACHINE STOCK ALLOY 6061... FOR VERSATILITY!"

Precision-made, high-volume screw machine parts cost less in aluminum

Here's versatility! Alcoa Alloy 6061-T6 or -T651, being lightweight aluminum, gives you three times more parts per pound than other, heavier metals. And this alloy gives *superior* finishes . . . can be joined easily by welding, brazing or soldering . . . may be anodized in a wide variety of colors . . . stands up to service under corrosive conditions! Machining speed, light weight and end-use adaptability . . . all add up to faster production, lower machining costs, higher profits.

Want to make cost conversions from brass to aluminum and compute costs quickly? Ask your Alcoa distributor or Alcoa sales office for your free *Alcoa Conversion Calculator*. Get your free *Alcoa Screw Machine Stock Estimating and Operating Data Book,* too . . . packed with technical data on aluminum screw machine stock. And ask about other Alcoa alloys: 2011-T3 or -T8 for superb machinability and still faster cutting, 2017-T4 or -T451 and 2024-T4 or -T351 for strength at low cost. Aluminum Company of America, 845-F Alcoa Building, Pittsburgh 19, Pa.

AS AN ALCOA CUSTOMER, YOU GET ALL THESE "EXTRA BONUSES":

1. Wide range of stock sizes for important price advantages.
2. Guaranteed market for up to 60 per cent of your Alcoa® Aluminum turnings and borings.
3. Extensive mill and distributor inventories to meet all requirements.
4. Chamfered ends at no extra cost.
5. Specific 12-ft lengths at no extra cost (for rounds up to 2¾ in.; hexagons up to 2 in.).

ALCOA ALUMINUM

SCREW MACHINE STOCK

CF&I WIRE HELPS PACKAGED for YOUR PRODUCTION

"CF&I-Wickwire Wire Spiders give us 25% increase in productivity...20% less downtime... 80% less scrap loss," says Mr. Robert Mangold, Production Superintendent.

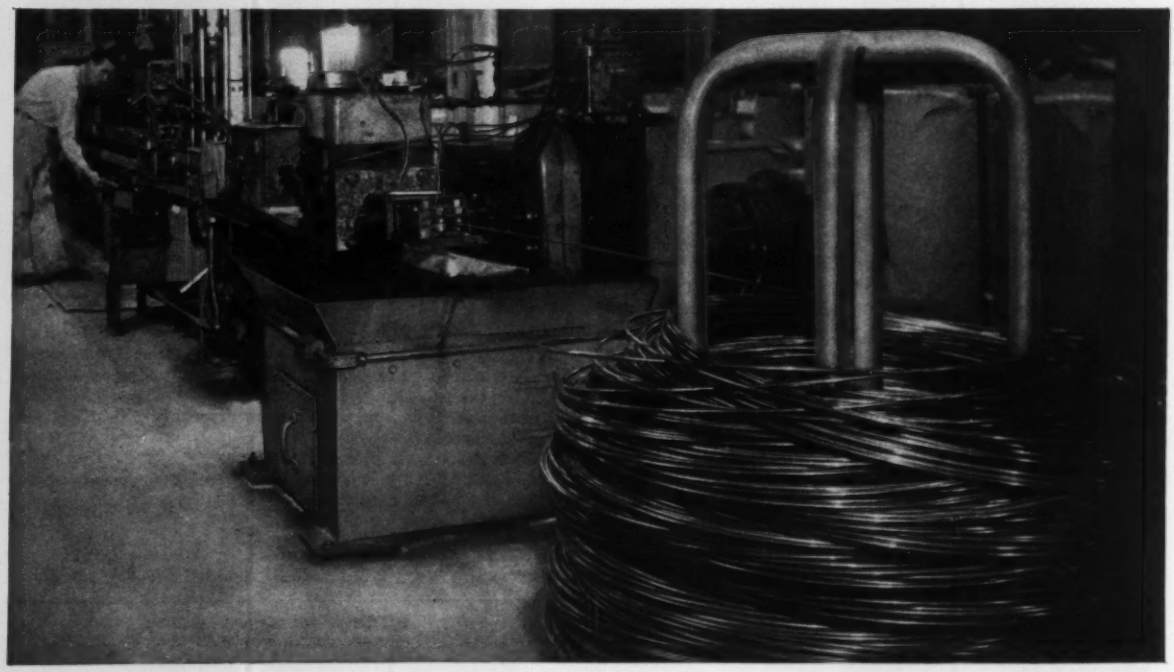
25% Increased Production—"Previously it required fifteen or twenty minutes to reset *each* of the eight to ten small coils used to feed our forming machine," explained Mr. Mangold. "For every eight hour shift, we lost two hours of production. Now with CF&I Spiders—which hold up to a 3000 lb. continuous length of wire—we change coils only once each shift. We save two hours per shift."

80% Less Scrap Loss—"Waste is an important consideration because we lost several feet every time we changed coils. Now we use only one and one-third CF&I Spiders each shift—instead of the eight or ten coils used previously—and have cut our waste 80%."

Increased Safety—"With small coils there was always the danger of the finishing end springing loose while rotating and striking equipment and personnel. With heavy-weight CF&I Spiders which revolve on a turntable while our machine withdraws the wire, the finishing end is securely anchored, reducing the possibility of tangling and eliminating this danger."

Improved Quality of End Products—"Since we do not have to reset the machine ten times a shift, the quality of our product is more uniform and we have fewer rejects," declared the superintendent of production. For a continuous operation, the end of one Spider can be butt welded to the start of another.

Reduced Handling Costs—"These sturdy Spiders have reduced our handling and storage problems, because each



INCREASE PRODUCTION 25%, CUT MANUFACTURING COSTS

At Bridgeport Brass Co., Flemington, N. J.

Spider contains as much wire as eight small coils. Unloading is safe and quick—one man with a fork lift can do the job easily, freeing several men for other important operations," Mr. Mangold pointed out.

Simplified Inventory Control—No need to sort through piles of wire coils...simply count the number of upright Spiders.

Save Storage Space—Spiders are stored compactly, requiring much less space than cumbersome coils. For maximum economy of space, Spiders can be doubled-decked which is equivalent to stacking 20 mill coils of 300 lbs.

Every CF&I Wire package offers one or more of the following benefits:

- **Reduced downtime through extra long continuous lengths of wire**
- **Simplified inventory control**
- **Fast, economical unloading and in-plant handling**
- **Continued cleanliness of the wire**

A CF&I representative will be glad to discuss your operation with you and recommend the wire package that will help save you time and money.

CF&I-WICKWIRE WIRE

THE COLORADO FUEL AND IRON CORPORATION

In the West: **THE COLORADO FUEL AND IRON CORPORATION**—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso • Farmington (N. M.) Ft. Worth • Houston • Kansas City • Lincoln • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City • San Francisco San Leandro • Seattle • Spokane • Wichita

In the East: **WICKWIRE SPENCER STEEL DIVISION**—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia

CF&I OFFICE IN CANADA: Montreal

CANADIAN REPRESENTATIVES AT: Calgary • Edmonton • Vancouver • Winnipeg

6930

For every foundry—best news in years!

Norton Resinoid Wheels

Norton Foundry News

NORTON

BETTER SNAGGING WHEELS!

B11 resinoid bond gives wheels more uniform structure and better balance, assuring faster, cooler grinding, plus smoother operation. B11 wheels are available in sizes, types and half-grade increments of hardness for all jobs — on your swing frame grinders and floor stands down to the smallest portables.

BN and BNA straight wheels, reinforced with glass cloth, are strong and safe, excellent for cutting and notching gates and risers. Made in thinnesses down to 1/16″ and 3/32″.

BD and BDA wheels, raised hub type, glass-nylon reinforced, are ideal for a wide job range — smoothing casting surfaces, cleaning between teeth of large gear castings, many slotting and cutting operations.

Better Quality Control!

Now Better Than Ever

Newest modern plant — designed and equipped to improve the wheels foundries need most — now going strong!

Plant No. 8, the newest Norton building in Worcester, is a good deal more than another regular step in the steady expansion of Norton manufacturing space.

This ultra-modern, multi-million dollar plant was built specifically to improve the manufacture and performance of resinoid wheels — the wheels foundries need most and use most.

Working equipment is up-to-the-minute in every detail. In-line production, now in full swing runs as smoothly and accurately as clockwork. Quality control, always a key factor in Norton leadership, is now as thorough as latest processing development can make it. New Plant No. 8 and its new resinoid wheels are the latest proof of how Norton maintains "Touch of Gold" performance at highest efficiency.

The better the processing, the better the performance. That's why every Norton resinoid wheel removes more metal per dollar throughout longer service life.

Small Cup Wheels . . . Lots of Safety

Built-in reinforcement is available in Norton cup wheels of standard size 6/4 3/4 x 2". The new steel cup bushing, molded firmly into the wheel back, does not replace a wheelguard but does provide additional safety — another valuable feature of Norton portable wheels that do more work with less operator-fatigue.

On-the-job reports of how Norton resinoid wheels are paying off in ferrous and non-ferrous foundries are in the new report, Norton High Speed Resinoid Wheels for the Foundry, shown here. Your copy is available from your local Norton Representative . . . and is as near as your phone. Call for it today. NORTON COMPANY, General Offices, Worcester 6, Massachusetts. Plants and distributors around the world.

NORTON
ABRASIVES

W-1966

75 years of . . . Making better products . . . to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Electro-Chemicals — **BEHR-MANNING DIVISION:** Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

STRIP for action . . .

The efficient action of a Flat Spring is dependent upon the quality of the STRIP STEEL.

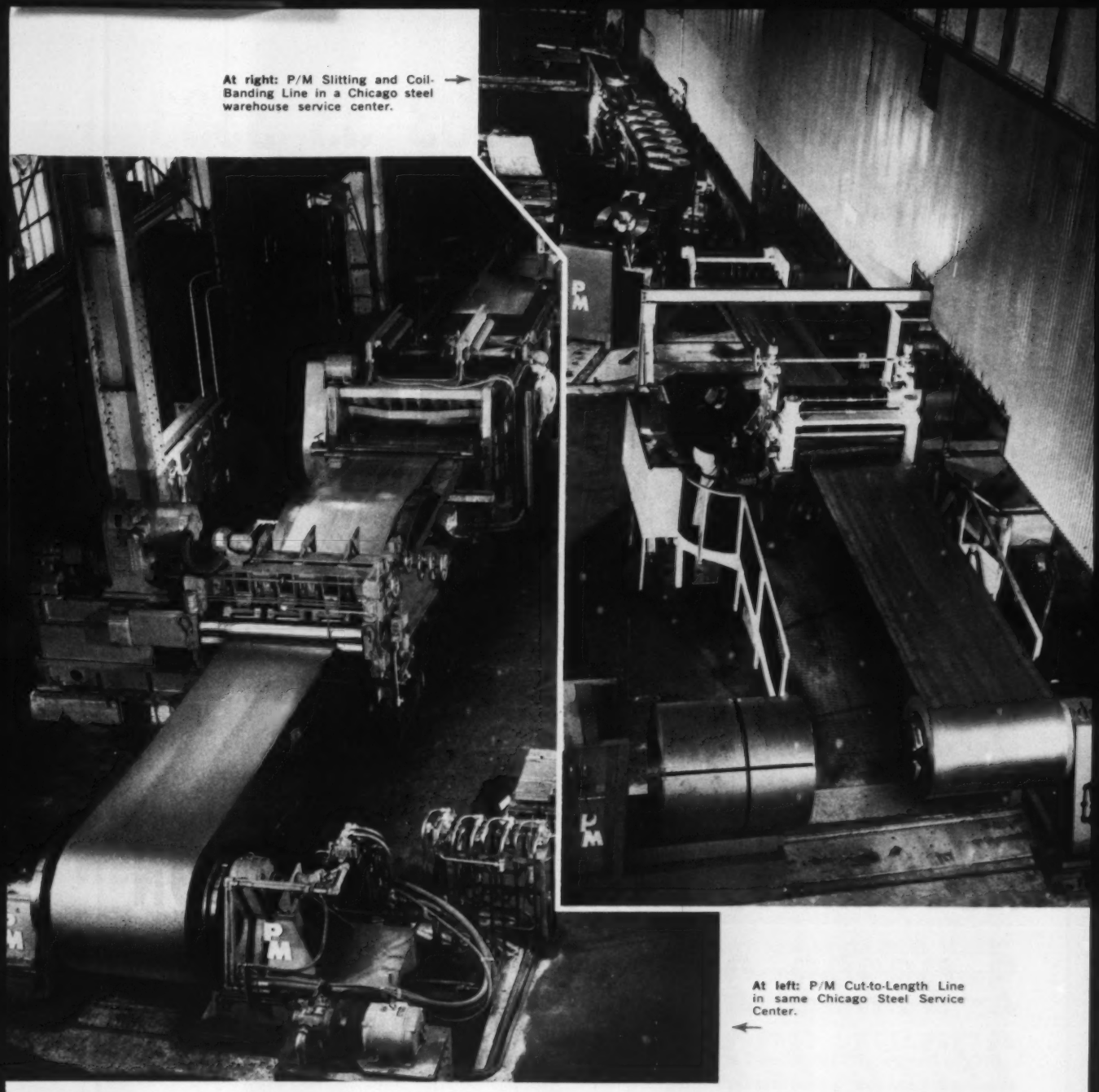
WASHBURN

has over fifty years of experience in solving spring steel problems, to guarantee the quality of your product.

WASHBURN WIRE COMPANY, NEW YORK CITY

WASHBURN

CLEAN, UNIFORM BILLETS - STRIP - RECTANGULAR, ROUND, FLAT RODS
TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES



At right: P/M Slitting and Coil-Banding Line in a Chicago steel warehouse service center.

At left: P/M Cut-to-Length Line in same Chicago Steel Service Center.

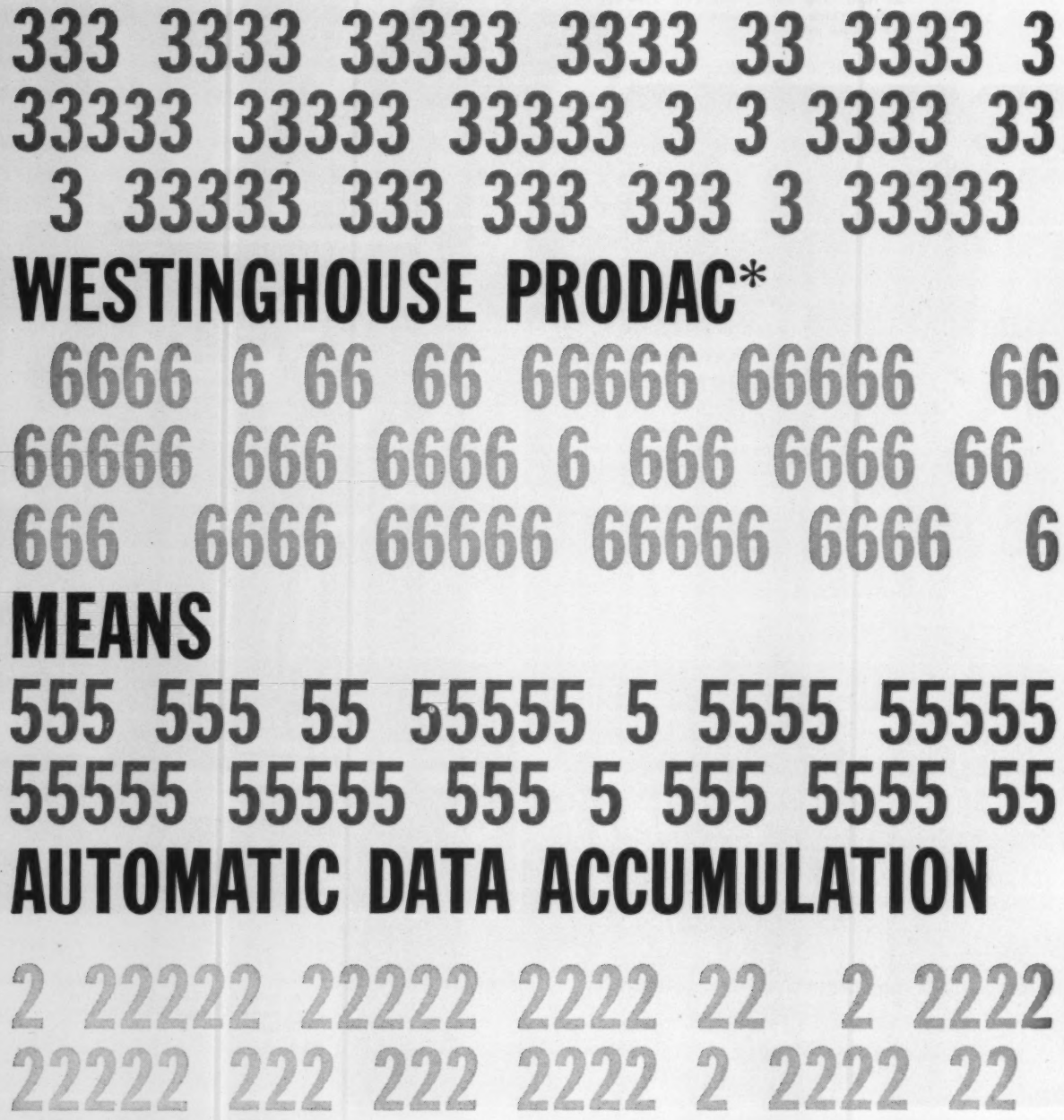
P/M Lines help make this Steel Warehouse a Service Center

Chicago area warehouse customers get faster service, a better product, as a result of new features built into P/M Cut-to-Length and Slitting and Banding Lines shown here. These lines incorporate special features which, developed through P/M's *productioneering* approach, fit the specific needs of steel service center operation, and increase the speed, accuracy, and economy with which these lines operate. *Productioneering*—designing and building a processing line to the particular needs of the user—makes P/M lines for warehouses simple to operate, easy to maintain, flexible to handle all warehouse requirements. We will be glad to furnish details about the advantages you can get from "productioneered" lines—just write to:

Production Machinery Corporation
MENTOR, OHIO

Designers and Builders of Metal Processing Lines and Equipment including: lines for pickling, slitting, shearing and cutting-to-length, grinding, scouring, coil build-up, inspection, and other sheet and strip processing lines and machinery.

P/M®



. . . keeps a permanent record of each foot of production . . . automatically registers all pertinent information and spots defect locations on the full production run. This is but one of the ways Westinghouse PRODAC† is now helping bring about the "mill of the future" today through completely automatic data accumulation systems.

Westinghouse has service-proven PRODAC installations that economically automate slabbing mills, blooming mills, reversing roughers, stock house materials handling and many other mill applications.

By specifying Westinghouse PRODAC for your mill, you open the door to many new cost-saving benefits which are unobtainable with conventional controls. For example, PRODAC assures the most consistent standards of quality control at the highest rates of production speed . . . coordinates operation of all machines at the over-all maximum efficiency . . . holds maintenance to a minimum, and practically eliminates control failures . . . gives you a "building block" design which provides flexibility required for future mill automation.

The entire team of Westinghouse PRODAC engineers is at your service to help you determine exactly where and how PRODAC can benefit you. Your Westinghouse sales engineer can give you complete information, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-22124

†Trade-Mark

*PROGRAMMED DIGITAL AUTOMATIC CONTROL

YOU CAN BE SURE...IF IT'S Westinghouse

TUNE IN WESTINGHOUSE-CBS TV-RADIO COVERAGE, PRESIDENTIAL CONVENTIONS, JULY 10-29

Hortonspheres built of USS "T-1" Steel for Compania Cubana Del Nitrogeno, S. A., Matanzas, Cuba. Designed, fabricated and erected by Chicago Bridge & Iron Company.

Weight cut 50%

in USS "T-1" Steel pressure vessels. Each of these two Hortonspheres in Matanzas, Cuba, has a capacity of 8,750 barrels of anhydrous ammonia. They are 45.5 feet in diameter and each shell weighs about 311,350 pounds. By designing them with USS "T-1" Constructional Alloy Steel, to an allowable working stress of 32,400 psi, the plate thicknesses were reduced to 1.109 inches and 1.075 inches. This is about 50% less than if A212-Grade B fire box quality steel had been used.

Result: Only 363 tons of USS "T-1" Steel were needed for both tanks, reducing by one-half the amount of steel that would otherwise have been required. Freight, handling, welding and erection costs were less—and the user got a stronger, tougher vessel with an overall saving in cost.

Fabrication steps: Plates of USS "T-1" Steel in widths of 78 inches and 115 inches and lengths up to 19 feet 2-½ inches were shaped cold and field stress relieved. Column plates and some shell plates were stress relieved in the shop. Electrodes used in field welding were low hydrogen type of the E110 strength level and all field welds were 100% radiographed. With a minimum yield strength of 100,000 psi, plus toughness, weldability, and high resistance to impact abrasion, USS "T-1" Steel is ideally suited for many applications throughout industry. Write for our latest booklet. United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

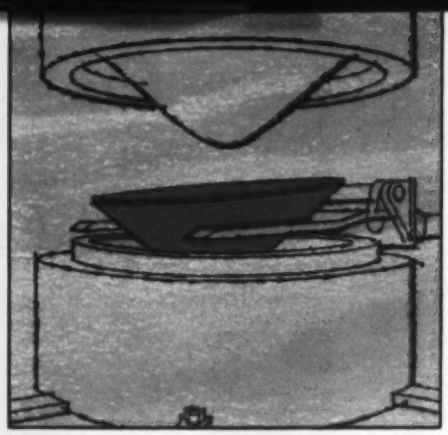
USS and "T-1" are registered trademarks

Hortonsphere is a registered trademark of Chicago Bridge & Iron Company

This mark tells you a product is made of modern Steel

United States Steel Corporation—Pittsburgh
Columbia-Geneva Steel—San Francisco
National Tube—Pittsburgh
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Supply—Steel Service Centers
United States Steel Export Company

United States Steel



Nose cone being removed from Wyman-Gordon-U.S.A.F. forging press.

Precision Forging of ATLAS Nose Cones

Inspection of copper nose cones at Wyman-Gordon-U.S.A.F. Plant.

When you need a large, custom-engineered die block, think of U. S. Steel first. Take this 40-ton die block shown in the final stage of forging on our 10,000-ton press. Designed by Wyman-Gordon for production of copper nose cones by closed die forging, this job received the personal attention of our metallurgists, forgers, and machinists from start to finish.

To obtain the correct hardness, our metallurgists chose a CrMoV alloy. An 85-ton electric furnace heat was then "vacuum-cast" into a 72″ diameter ingot to produce the best internal quality possible. Under the careful supervision of our forge team, the ingot rapidly assumed the final contours. As you can see, the die impression was "forged-in" with a special cupping tool for maximum toughness.

This die block was then subjected to a series of heat treatments and machining operations, closely coordinated between heat-treater and machinist, to produce maximum performance at the Wyman-Gordon-U.S.A.F. Plant. Final inspection of the rough machined block included hardness and ultrasonic testing as well as a close check of dimensions.

In addition to large die blocks such as this one, U. S. Steel makes many types of forgings—all by a team of experts. Let them handle your next order. You'll be assured of a high quality product, specifically engineered for your particular application.

USS is a registered trademark

United States Steel Corporation—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Export Company

United States Steel

USS

Wood proves Stainless Steel is simple to fabricate

General Sales Manager, C. Paul Carlson, points to the Stainless Steel milk cans designed and manufactured by the John Wood Company.

There's probably no one that has more experience and know-how with Stainless Steel fabrication than the John Wood Company. At eight different plants in the U. S. and Canada, the company makes everything from gasoline pumps to milk strainers. At their St. Paul plant they are equipped to produce 50% of the Stainless Steel can requirements for the entire dairy and dispenser industries.

The company worked closely with sanitation experts and health officials to design a Stainless Steel can that meets the strictest regulations for both material and workmanship. And at the same time, they found ways to simplify fabrication and save time and materials. They developed methods of hydraulic forming, welding, grinding and polishing that have paid off in lower costs and a quality product. These Stainless cans have a hard, durable finish that is easy to clean, ready for long, sanitary service. The John Wood Company proved that Stainless Steel isn't difficult to fabricate, it's just different.

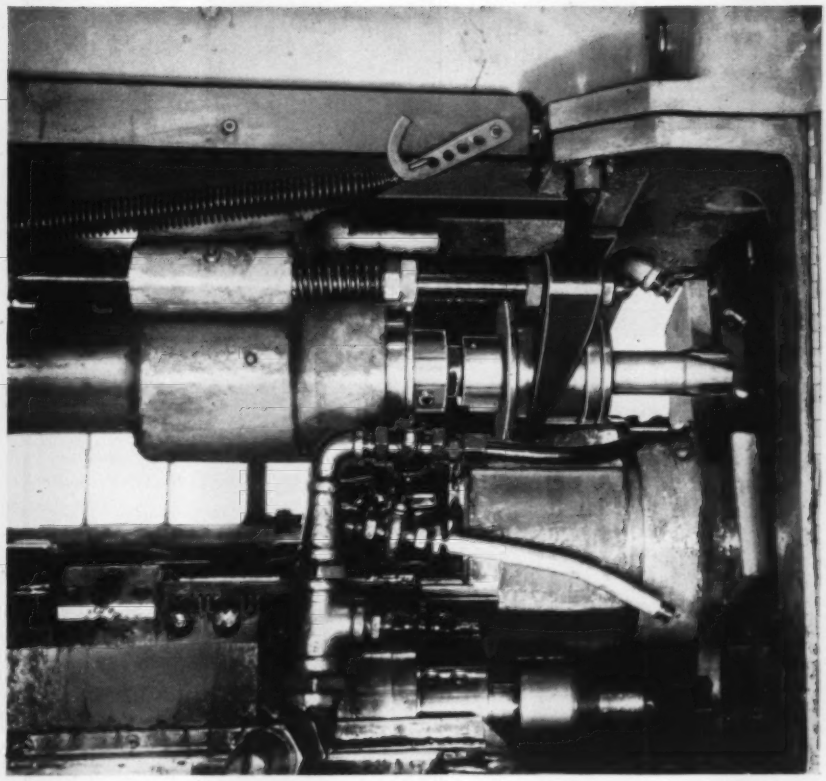
If *you* would like to have complete information about working with Stainless Steel, write for a free copy of our *Stainless Steel Fabrication Book*. United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS is a registered trademark

USS

United States Steel Corporation—Pittsburgh
American Steel & Wire—Cleveland
National Tube—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Supply—Steel Service Centers
United States Steel Export Company

United States Steel



LANDIS TAP for bar automatics

3000 pieces between grinds at 140 SFM

A LANDIS Collapsible Tap is giving excellent chaser life producing taper threads during high-speed machining runs at the Grabler Manufacturing Co., Cleveland, Ohio.

The 2LL Tap is shown installed on a New Britain Automatic machining 350 malleable iron union bodies per hour. Though threading at the high speed of 140 SFM, 3000 1½" 11½ pitch NPT threads are produced between chaser grinds.

LANDIS LL Receding Chaser Collapsible Taps feature a receding action that contributes to excellent chaser life. A precision mechanism diametrically recedes the chasers during threading at a rate equal to the desired thread taper. This reduces cutting strains by restricting cutting action to the throat or chamfer section, provides longer chaser life between grinds, and results in the generation of a truly conical taper thread with no chaser leave off marks.

LL Taps, designed especially for taper threading, can be furnished for rotary or stationary applications from 1-5/16" to 20" in diameter. For more details write for Bulletin G-95.

506

LANDIS *Machine* COMPANY

WAYNESBORO

PENNSYLVANIA

FOR QUALITY
PRODUCTIVITY
PROFIT

INTEGRATED AUTOMATION
BY GENERAL ELECTRIC

G. R. BROWN, Manager of General Electric's Metal Rolling and Processing Sales, talks about new automation capabilities at General Electric.

Integrated Automation

"General Electric is ready now to assist you with the ultimate in automation . . . automation of your entire plant."

To date, General Electric has concentrated on the complex problems of automating your individual processes. Now, with actual installations completed, individual-process automation has become a reality. General Electric has now taken the next logical step in sound automation planning.

With newly developed products and system technology, General Electric engineers can now link your "islands of automation" to provide complete automation of an entire production area.

With this major phase of your automation program complete, it then becomes possible to link automated production areas by means of a master computer-control system, thus providing completely integrated automation of the entire plant.

Based on a step-by-step modernization approach, General Electric's plan provides flexibility for technological and economic developments in your company. At the same time, it enables you to begin now, taking advantage of the many benefits of automation.

For example, the first step in integrated automation has already been taken by many metal producers. New rolling mills automated by General Electric are automatically keeping strip "on gage" to minimize scrap and boost yield. Primary rolling costs are being reduced through application of G-E programming and

means effective control of your entire plant

computer systems. G-E automated systems will eliminate charging errors in many blast furnace operations, increasing furnace profits. In many mill operations, G-E automated systems are making available, immediately, critical data in the most usable form to permit wise and timely management decisions resulting in improved and more consistent product quality, reduced operating costs and optimum utilization of the mill.

The next step for many of these metal producers will be the linking together of "islands of automation." By application of General Electric automatic computer-control equipment, greatly improved programming for an entire sequence of processes will result. All operations can then be effectively measured and evaluated early enough to allow modifications that will quickly satisfy conditions in any individual process. An entire production area will become responsive to directives originating from a central source.

Finally, as production areas are linked by a master computer-control system, completely automatic production scheduling and manufacturing throughout the entire plant will result. Over-all performance will be in direct accord with management decisions based on incoming orders, related process operations, materials inventories and all of the many complex variables that determine profitable plant operation.

Let General Electric begin working with you now in your planning for future profits. You'll find that the capability to provide the ultimate in automation is a reality at General Electric today. For more details, call your nearest Apparatus Sales Office. General Electric Company, Section 659-131, Schenectady 5, New York.

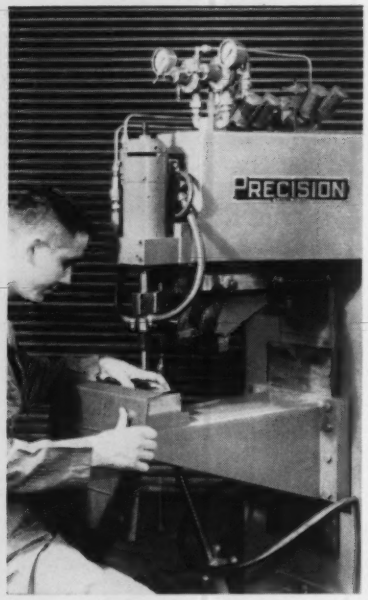
AUTOMATION THROUGH MODERNIZATION

GENERAL ELECTRIC

PRECISION® Quarterly NUMBER 5

PRECISION WELDER AND FLEXOPRESS CORPORATION, 3520 Ibsen, Cincinnati 9, Ohio

COAT FIRST WELD LATER



CINCINNATI — Never underestimate the power of a magnet. Because Precision Welder and Flexopress Corp. found a way to put one to work, vinyl coated steel will now fulfill its manifest destiny.

Magnetic force welders, built by Precision, are poised with balanced armatures to open up the whole coated metal market. Now manufacturers can take strip-coated (even painted) steel, form it, and assemble by welding *without marking the coating*.

The organic coatings can be rolled on, sprayed on, brushed on, mill applied; they can be thick or thin, glass hard or rubbery—it really doesn't make any difference, because the secret is in the welding, not the coating.

NEAT HEAT—To weld coated metal, you have to run the welding current in and out of the uncoated side of the metal, and you have to do it with such controlled heating and forging that not enough heat passes to the far side to color or distort the coating. That's quite a trick, which Precision accomplishes with magnetic force welders, like the one in the picture. A good deal of esoteric know-how, hot from Precision's research laboratory, goes with these machines—tips like how big and what shape to make the weld projections, for example.

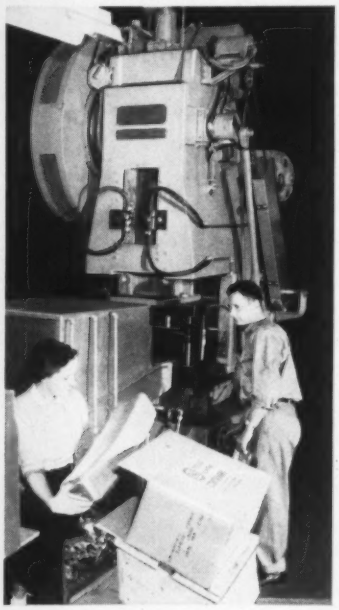
These welds are practical on stock as thin as .015 inch. Size of weld is limited on thin material, but weld strength can equal AWS standards on vinyl coated stock of 20 gage. Ordinarily a matte finish is easier to handle than a high gloss coating, but don't let gloss scare you—in a year or so, you will probably be welding preplated steel.

BRIGHT VINYL WORLD—Available today are Precision vinyl welders for high production jobs, welders, for instance, that can weld a dozen brackets at once to a precoated automobile instrument panel, and never mark the finish. One Precision breakthrough that makes such welders possible is a new gun-type magnetic force welding head. It is cylindrical for compactness, lightness, and effective magnetic attraction.

Because Precision got started down the coated metal road three-four years ago, that car you drive in 1961 will probably have vinyl or acrylic steel-backed trim, held in place by welded-on brackets that you won't guess are there because the welds won't show. And then get set for the deluge: Luggage, business machines, furniture, wall panels, cabinets, lighting fixtures, hardware, appliances, strip-coated first, formed second, welded last. What a lovely sound that money saving makes!

How to Foil Foil

Every tasty pastry has a pieplate all its own—thanks to aluminum foil. And, frankly, thanks to Flexopresses too, like the one in the picture taken at the Reynolds Metals Co. plant in Richmond, Va.



Ninety per cent of all the foil fabrications done in the United States today are done on Precision Flexopresses, made, naturally, by Precision Welder and Flexopress Corp., Cincinnati. That includes pie plates, cake pans, and those ribbed jobs that keep the parts of your TV Dinner from getting acquainted.

Why should Precision be proud of forming foil when everyone knows it's so soft you can crumple it up in your fingers? Because making aluminum foil behave at high speed is about as easy as standing a wet bed sheet on edge. And you have to form foil at around 200 finished parts a minute to make it pay.

That's where the exceptional accuracy and speed of Flexopresses come into play. You'll be eating rolls from a thin aluminum pan tonight because years ago a Flexopress engineer discovered that the way to make a press go fast and stay accurate is to guide the ram with preloaded ball bearing ways—*a Precision exclusive.*

PRECISION

THINNER AND WIDER

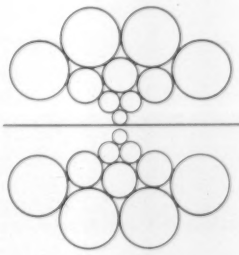
Reliable Rodney says:

If you're looking for a dependable source of cold rolled thin strip and foil, come to Rodney Metals. Our Sendzimir mills with non-contact, feed-back gauging, automatically recorded; continuous lines for bright annealing and tempering, plus precision slitters enable us to deliver strip metals in widths up to 24" and foil thicknesses held to 3% of gauge, even across the widest strip.

Complete inventories of all popular sizes in stainless steel are maintained in our warehouse of Rodney Metals of California, Inc. and direct mill special lot shipments guarantee you deliveries on time. Our quality control and research laboratory is always ready to work with you on special problems involving either conventional or exotic metals.

We are currently supplying the aircraft, automotive, electronics and other industries with thin stainless strip and other alloys rolled to table-top flatness for honeycomb cores and skin, jet blankets, instruments, and many other applications requiring precision rolled strip.

If you now use this type of product or have future requirements for it we would welcome the opportunity of working with you.



RODNEY ROLLED IS
QUALITY CONTROLLED

RODNEY METALS, INC., (MILL) NEW BEDFORD, MASS.
West Coast Office and Warehouse: 5462 East Jillison St., Los Angeles 22, Cal.

"When we invited our people to join, our participation jumped 20%!"

"Early last month I checked with our Payroll Department. I found that less than 28% of our employees were enrolled in the Payroll Savings Plan. So I contacted our State Savings Bond Director and asked for his help and advice.

"He worked out an effective plan by which every person in our company was *invited* personally to join the Plan. You know, sometimes you hesitate to do a thing like this. Employees may think you are trying to use a little pressure. But the way we did it, there wasn't any pressure at all. We just explained the advantage of this systematic way of investing, and showed how convenient it is. Then we invited them to join with the millions of other Americans who are building personal security—and strengthening our country's peace power—through Savings Bonds. As a result we have better than 45% of our staff enrolled, and our participation is improving every payday."

Is *your* company enjoying the advantages of a substantial participation in the Payroll Savings Plan? Other first-line companies find that helping their people save regularly in U.S. Savings Bonds reduces employee turnover, improves safety records and steps up morale materially. If you'd like to see your company's participation increased, contact your State Savings Bond Director. He'll be glad to help you spread the latest information on Payroll Savings, person-to-person.

NOW! U.S. SAVINGS BONDS EARN 3¾%

STEEL
The Metalworking Weekly

THE U. S. GOVERNMENT DOES NOT PAY FOR THIS ADVERTISEMENT. THE TREASURY DEPARTMENT THANKS, FOR THEIR PATRIOTISM, THE ADVERTISING COUNCIL AND THE DONOR ABOVE.

the Udylite V.I.P.

an outstanding production record

RECORD OF PERFORMANCE

EQUIPMENT:	**V.I.P.** automatic barrel plating machine
OWNER:	The Production Finishing Company
LOCATION:	Cleveland, Ohio
OPERATION:	Job shop—zinc plating
BARREL LOADS:	As high as 200 lbs. per cylinder
MAINTENANCE:	Minimum—practically no down time or expenditure for months
PRODUCTION:	Ability to run "around the clock"
PLATING:	Excellent uniformity of thickness and quality due to precise control.

Learn the full story of V.I.P. and you'll discover how this efficient modern equipment can give you a competitive edge. Get the facts today—from your Udylite man or write directly to

the udylite

world's largest plating supplier

corporation • **Detroit 11, Michigan**

on the west coast: the L. H. Butcher Company

SERVICE CENTERS?

WHO NEEDS 'EM?

"Sure, it's a little crowded around here, but by golly we found room for a good, safe stock of steel.

"It's a bit tricky finding the pieces we need, maybe, but the stuff is here, all right—somewhere.

"Fact is, you caught me in the act of writing an order for another batch of steel. Can't afford a secretary any more. Can't afford a typewriter, either. Had to hock everything in sight to scrape up some more capital.

"By the way, could you lend me a stamp?"

FOR FAST DELIVERY . . . FOR STEEL TAILORED TO YOUR REQUIREMENTS . . .

Call Your Steel Service

BETHLEHEM STEEL COMPANY,

Our friend may not agree, but it's a fact that the cost of steel inventories can be a major cost of doing business. Many firms have found that this cost can be kept in line by letting Steel Service Centers carry their inventories.

Service Centers maintain a bigger stock and a wider range of steel products than most companies could hope to carry. Furthermore, they are equipped to process this material as required and deliver it *fast*—right to your door.

CARBON AND ALLOY BARS, made from new-billet steel, are readily available in all standard grades, shapes, and sizes, from Service Center stocks.

SHEETS—hot-rolled and cold-rolled—as well as Bethcon (Bethlehem's continuously galvanized steel sheets) can be purchased from Service Centers coiled, sheared, or slit to the desired dimensions.

PLATES AND TOOL STEEL are additional Bethlehem products supplied through Steel Service Centers.

STRUCTURAL AND BAR-SIZE SHAPES from Bethlehem mills are available from the ample stocks of many Steel Service Centers. They'll cut them to length, too.

CONCRETE REINFORCING BARS, hot-rolled by Bethlehem from new-billet steel to ASTM specifications, are available in sizes No. 2 through No. 18-S.

Center

BETHLEHEM, PA.

BETHLEHEM STEEL

MCA FLUX
AND RIMMING STEEL

Very revealing tests may be made for uniformity of analysis of rimming steels, by comparing top to bottom, rim and core, edge to center, between MCA flux treated and non-treated ingots. Elements most readily segregated—sulphur, carbon, phosphorous and nitrogen—are held in remarkably close limits through the economical use of rare earths.

This allows the use of even larger ingots, with its attendant production economies. For example, rare earth additions to larger rimming ingots of 50,000—60,000—70,000 pounds afford a quality and uniformity formerly obtained only in smaller ingots.

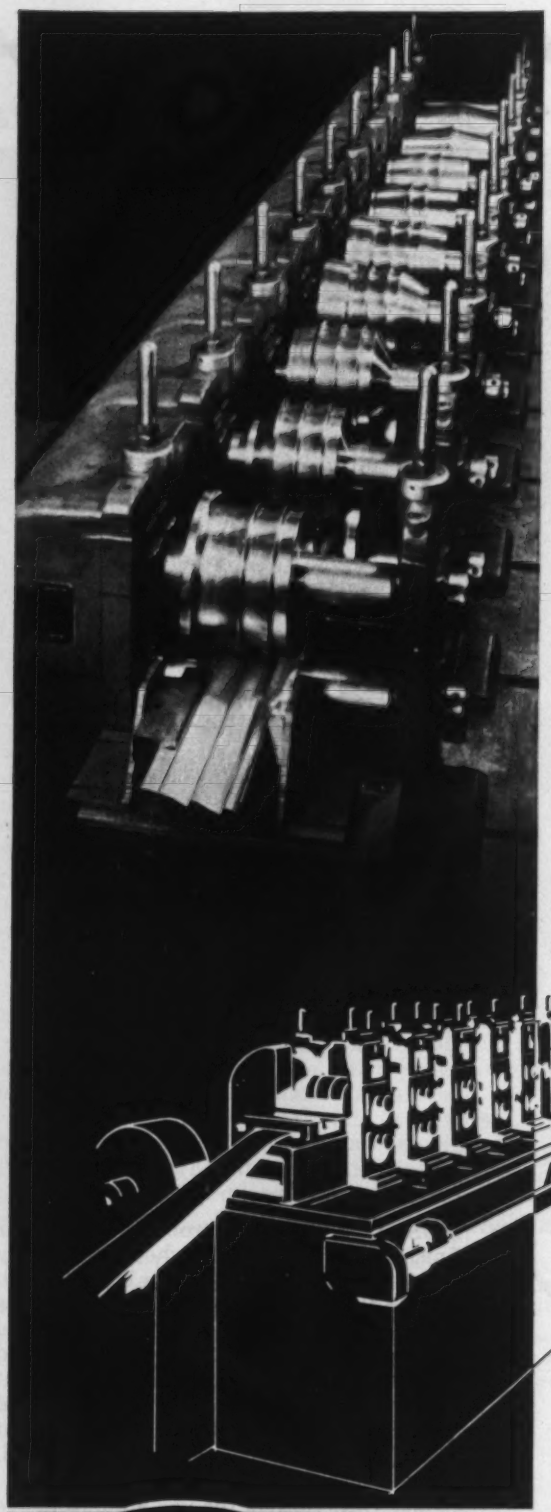
Alert engineers and metallurgists are now studying large rimming ingot products made possible by using our MCA flux. MCA, the leading rare earth producer and processor, has valuable technical information on this subject, and will be happy to share it with you. Write today for specific information.

MOLYBDENUM

2 Gateway Center CORPORATION OF AMERICA **Pittsburgh 22, Pa.**

Offices: Pittsburgh, Chicago, Los Angeles, New York, San Francisco
Sales Representatives: Brumley-Donaldson Co., Los Angeles, San Francisco
Subsidiary: Cleveland-Tungsten, Inc., Cleveland
Plants: Washington, Pa., York, Pa.

MCA



Yoder
Roll-Forming Equipment mass-produces shapes accurately, economically

Yoder Roll-Forming Equipment, even with part-time operation, can effect significant savings in many metal working applications and industries. Shapes, simple or complex, can be quickly and economically produced the Yoder way from a wide variety of flat-rolled coated or uncoated stock . . . in thickness up to ¾ inch . . . in speeds up to 50,000 feet per day.

Yoder engineers flexibility and precision into metal forming operations. For example: many basic shape modifications, such as coiling, welding, notching, ring-forming, perforating, and cutting to length can be simultaneously accomplished with little or no additional labor cost.

Yoder also makes a complete line of Rotary Slitters and Pipe and Tube Mills. Profit from Yoder's years of engineering and service experience, contact your local Yoder representative or send for the Yoder Roll-Forming Manual.

THE YODER COMPANY
5502 Walworth Avenue
Cleveland 1, Ohio

This fully-illustrated 88-page book clearly discusses every important aspect of Yoder Roll-Forming Equipment and methods . . . it's yours for the asking!

ENGINEERING
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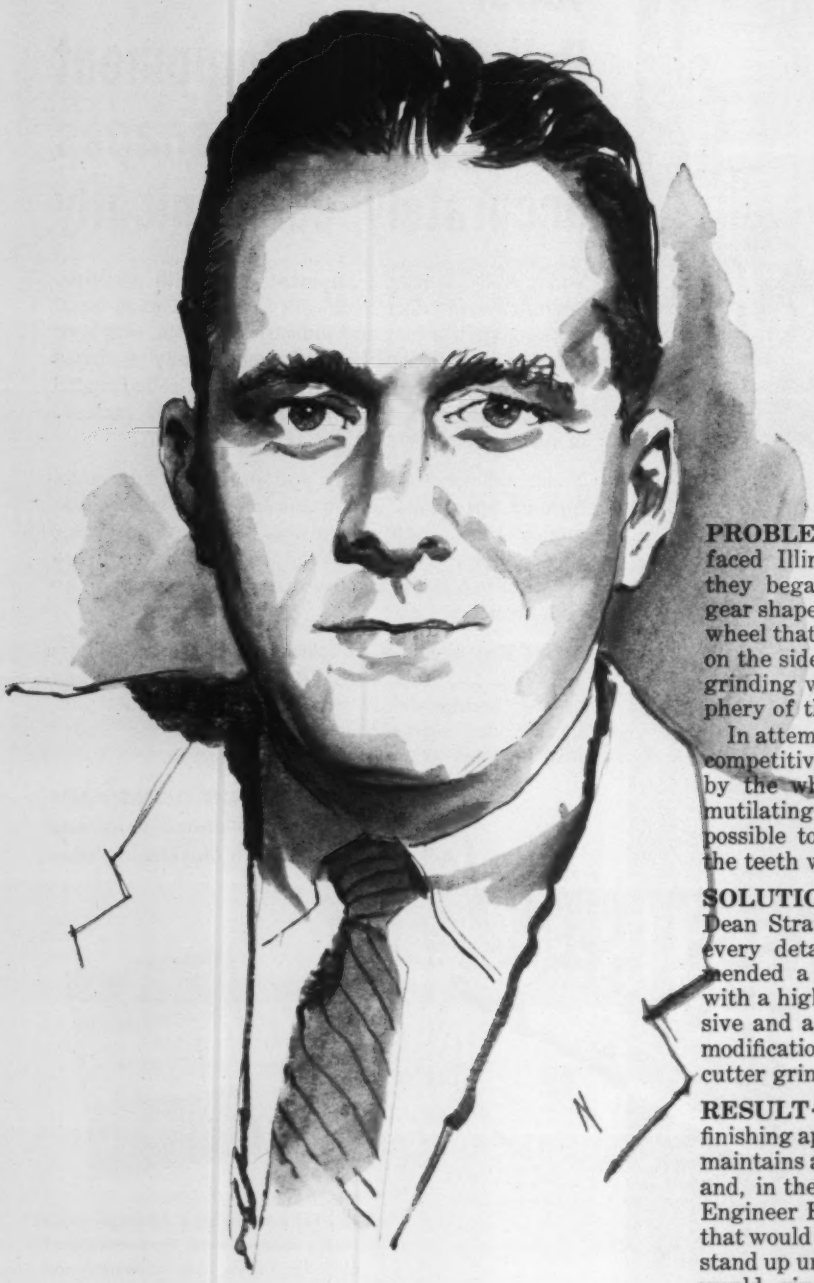
ROTARY SLITTING LINES

Dean Strand solved an unusually



Dean Strand's many years as an Abrasive Specialist and a salesman for machinery that uses grinding wheels have covered most of the problems in the book. That's why he so often finds practical solutions that are *not* in the book.

PROBLEM – An unusual grinding problem faced Illinois Tool Works, Chicago, when they began manufacturing a special steel gear shaper cutter. They required a grinding wheel that would generate an involute curve on the sides of the gear shaper cutter teeth, grinding with the side instead of the periphery of the wheel.

In attempting this grinding operation with competitive wheels, production was delayed by the wheels breaking down, glazing or mutilating the gear-teeth walls. It was impossible to maintain the involute shape of the teeth within specified accuracies.

SOLUTION – Bay State Abrasive Specialist Dean Strand was called in and went over every detail of the operation. He recommended a 16" diameter x 5/8" thick wheel with a highly friable aluminum oxide abrasive and a special Bay State vitrified bond modification, on Illinois Tool's gear-shaper-cutter grinding machine.

RESULT – No further problems on this gear finishing application! The wheel consistently maintains accuracies to within 1/10,000-inch and, in the words of Illinois Tool's Process Engineer Ed Leighton, "we wanted a wheel that would grind without glazing, that would stand up under these unique conditions, that would give us reasonable wheel life and would enable us to get real *production* out of our machine. Well, thanks to Dean Strand, we've got it."

Like Dean Strand, the Bay State Abrasive Engineer in your area is a trained expert. He backs up the work of the experienced men who represent Bay State's topflight distributors; and Bay State's research labs back them both with new ideas, techniques and materials. *Better grinding at lower cost . . . that is our business.*

difficult grinding problem at Illinois Tool Works

(*Above*) Operator Dale Jackson at his gear-shaper cutter-grinder equipped with a Bay State 16 x 5/8-inch aluminum oxide abrasive wheel. Grinding is done by side of wheel instead of face. 1/10,000" accuracy is consistently maintained.

(*Right*) Process Engineer Ed Leighton and Inspector Leroy Wegner, of Illinois Tool Works, checking the tooth angle on a gear-shaper cutter. Extreme accuracy of the helical lead, and its involute shape, are vital to the completed product.

BAY STATE ABRASIVES

BAY STATE
WHEELS of PROGRESS

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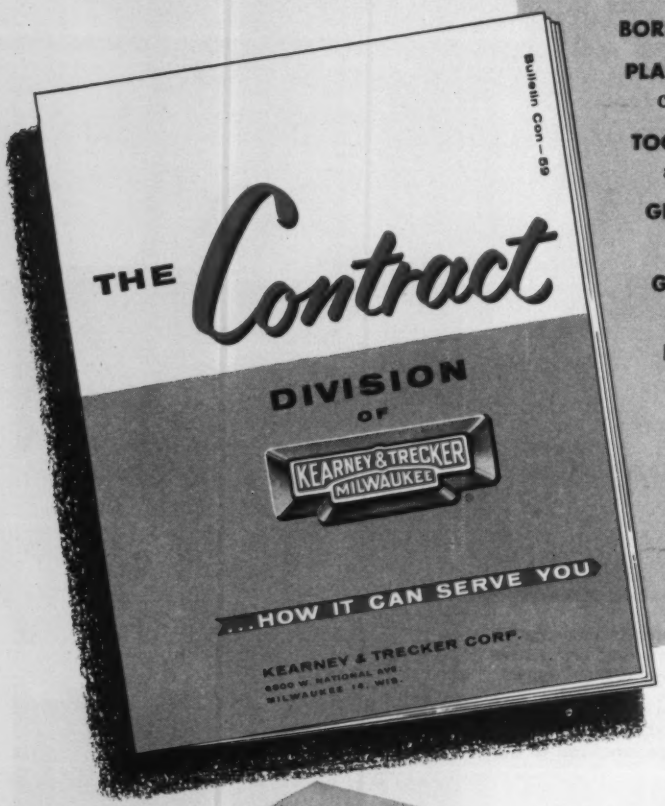

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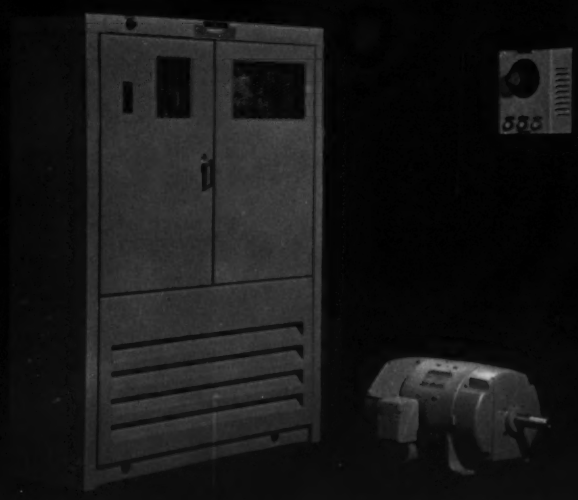

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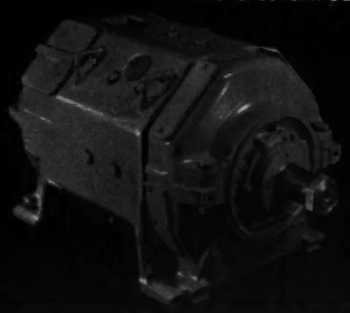

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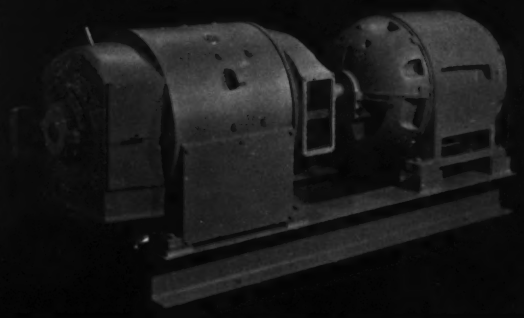

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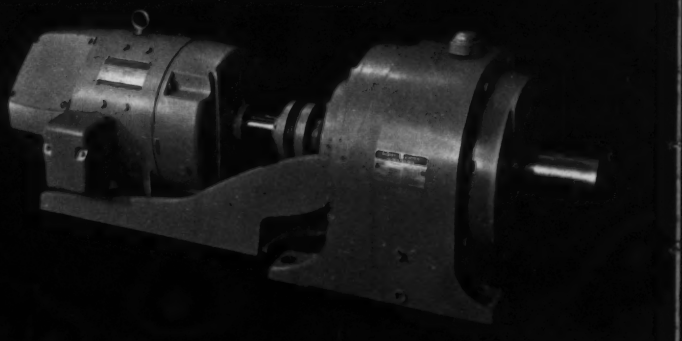

ACTUAL SIZE

This unusual part for BUNN Package Tying Machines is typical of the many shapes and sizes forged by WILLIAMS, weighing from a few ounces up to 250 pounds.

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develop maximum strength, super toughness even in complex parts like this

Williams proved that a properly designed forging was the best method to produce this complex part for B. H. Bunn Company, Chicago, Ill., manufacturers of package tying machines. We make many other complicated Bunn parts to tolerances that require little or no machining. They are all designed for rugged performance under constant stress. Not one has failed yet!

The basis for *strength* and *toughness* in forgings requires the proper determination and control of flow characteristics of the metal used. Here at Williams we call it Forging Design Development. Coupled with skilled forging techniques, we produce many special jobs others say "can't be done."

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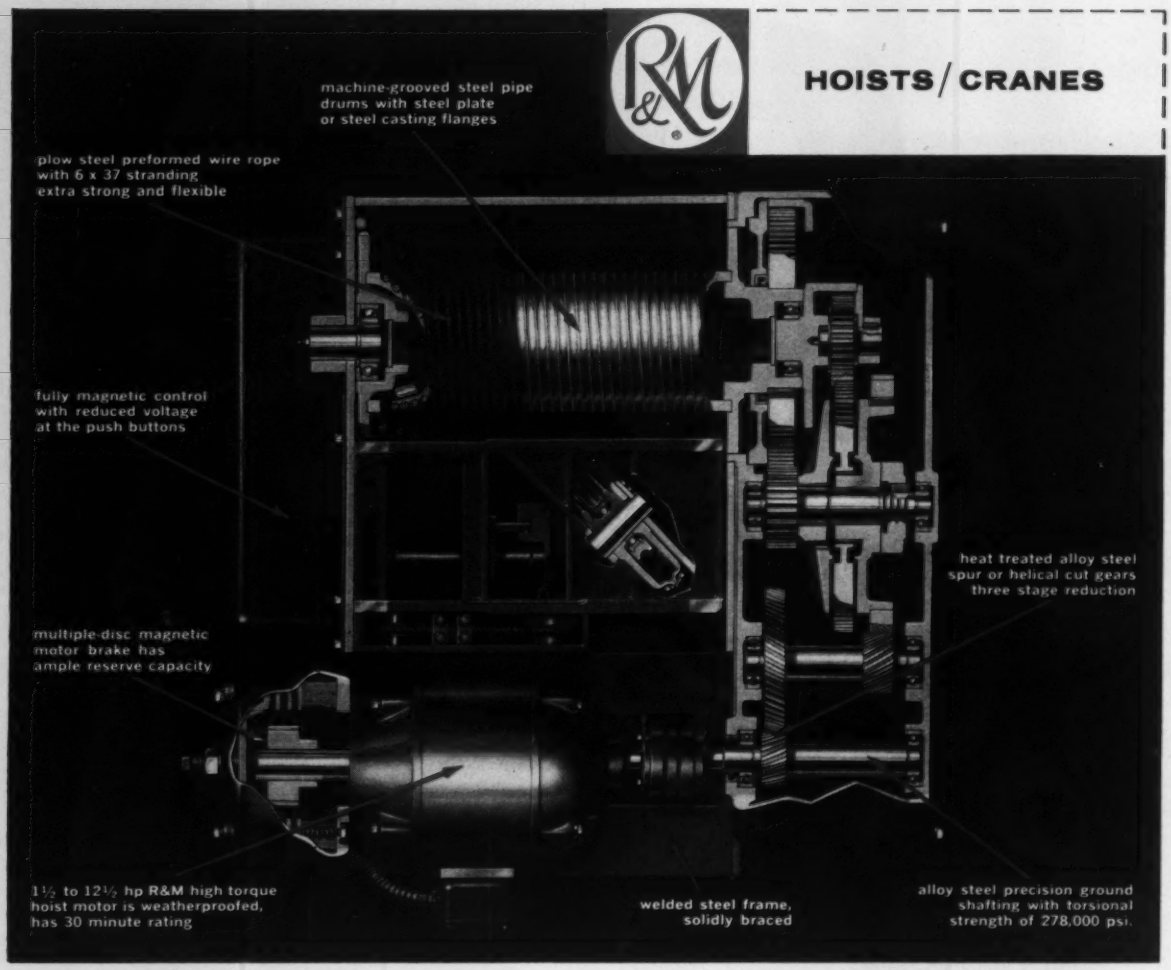
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Robbins & Myers heavy duty Type F hoists have compact, beam-hugging profiles to save overhead space in your plant. For example, the F-2 has a headroom of only 17", yet provides 2 ton lifts on a path of steel extending from beam to hook. And F hoists are built for toughest use: frame is welded steel, alloy steel gears are heat treated, ball and roller bearings are used throughout. Weatherproof R&M 220/440 v.a.c. motors–to 12½ hp–drive through three gear reductions. These are the hoists to choose for day-after-day production lifting where maximum dependability is important. You can standardize on F hoists throughout your plant because the line is as economical as it is broad: capacities–½ to 10 tons, mounting–lug, plain or geared hand trolley, 3 types of motorized trolleys. Request Bulletin 920. Hoist & Crane Division of Robbins & Myers, Inc., Springfield, Ohio or Brantford, Ontario.

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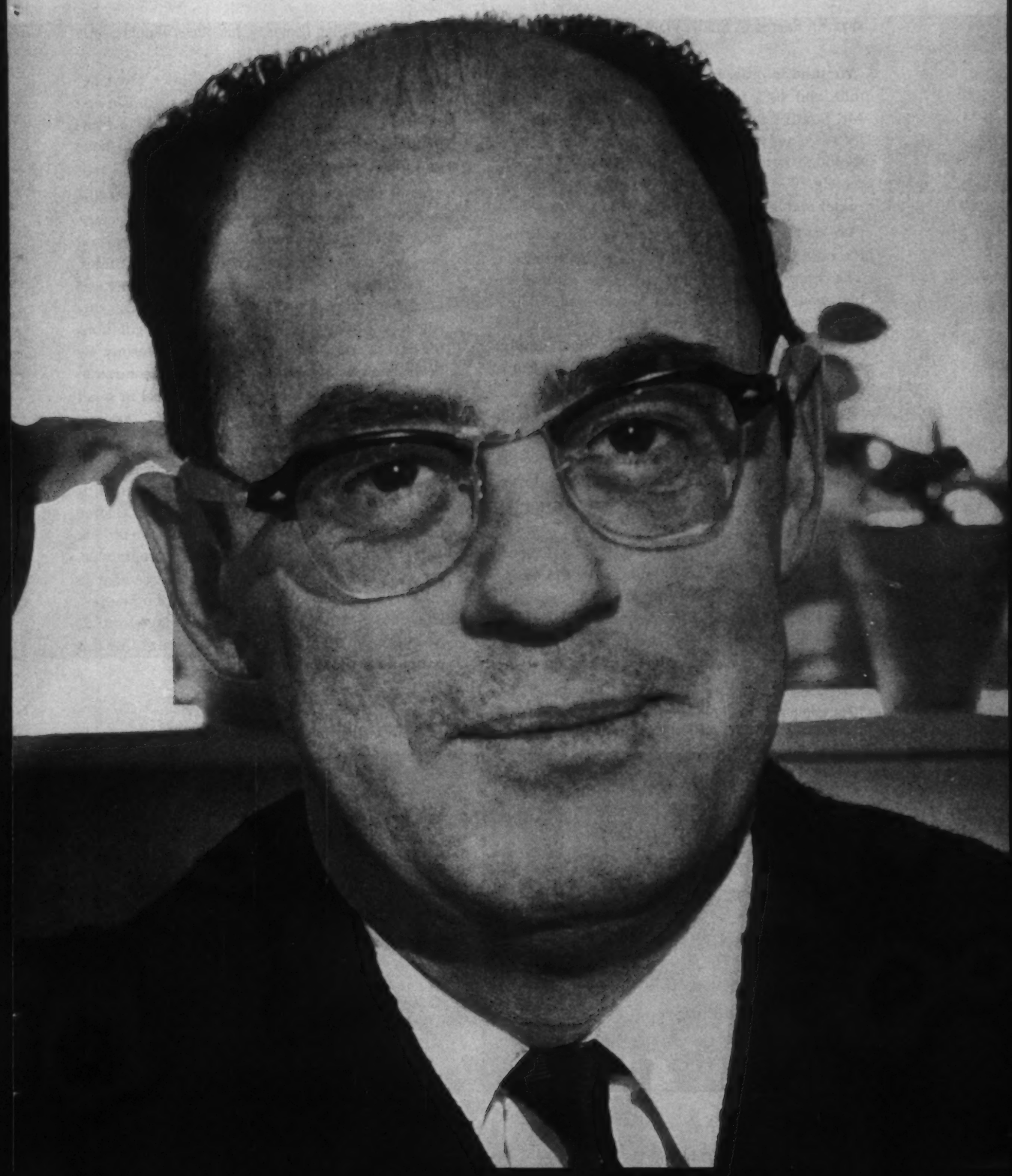


"...and made a 15% overall savings

says Mr. George W. Smith, Plant Superintendent, Barnard & Leas Manufacturing Company, Inc., Cedar Rapids, Iowa

"We used to order 60% of our materials from the mill, and 40% from a steel service center," says Mr. Smith. "But during the recent steel strike, we looked closely at our inventory situation. After a thorough study, we revised our operation completely. We now order 70% from a steel service center and 30% from the mill.

"We had a scrap problem when we ordered from the mill, because we had to process the materials. The scrap had to be handled and stored until we had enough to market. Today, we order wide flange beams, angles and channels, plate, sheet, and bar size flats and angles direct from U.S. Steel Supply, and they're delivered *pre-cut to the exact shape and size.*

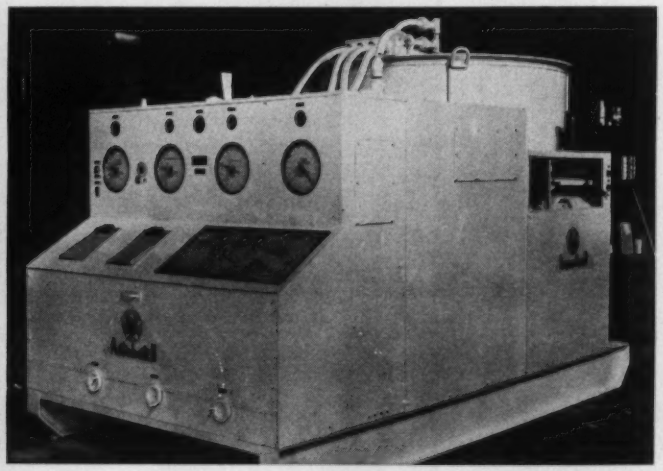
"This saves time and we don't have to invest in expensive machining equipment. And here's another point: the quick and reliable service we get from U.S. Steel Supply has more than once allowed us to accept an urgent order for a piece of heavy equipment.

"For instance, our associate company, Transport Trailers, Inc., was asked to build a 100-ton trailer to transport oil in the North African desert—this job demanded a tough, durable trailer. *We had one month to build it.* Immediately, we called U.S. Steel Supply, gave the order, and explained the urgency of the situation. Two days later, the material arrived pre-cut to the specified sizes. *We met the deadline.* The mill would've taken two or three months to deliver this order, and we'd still have had to cut the material to size.

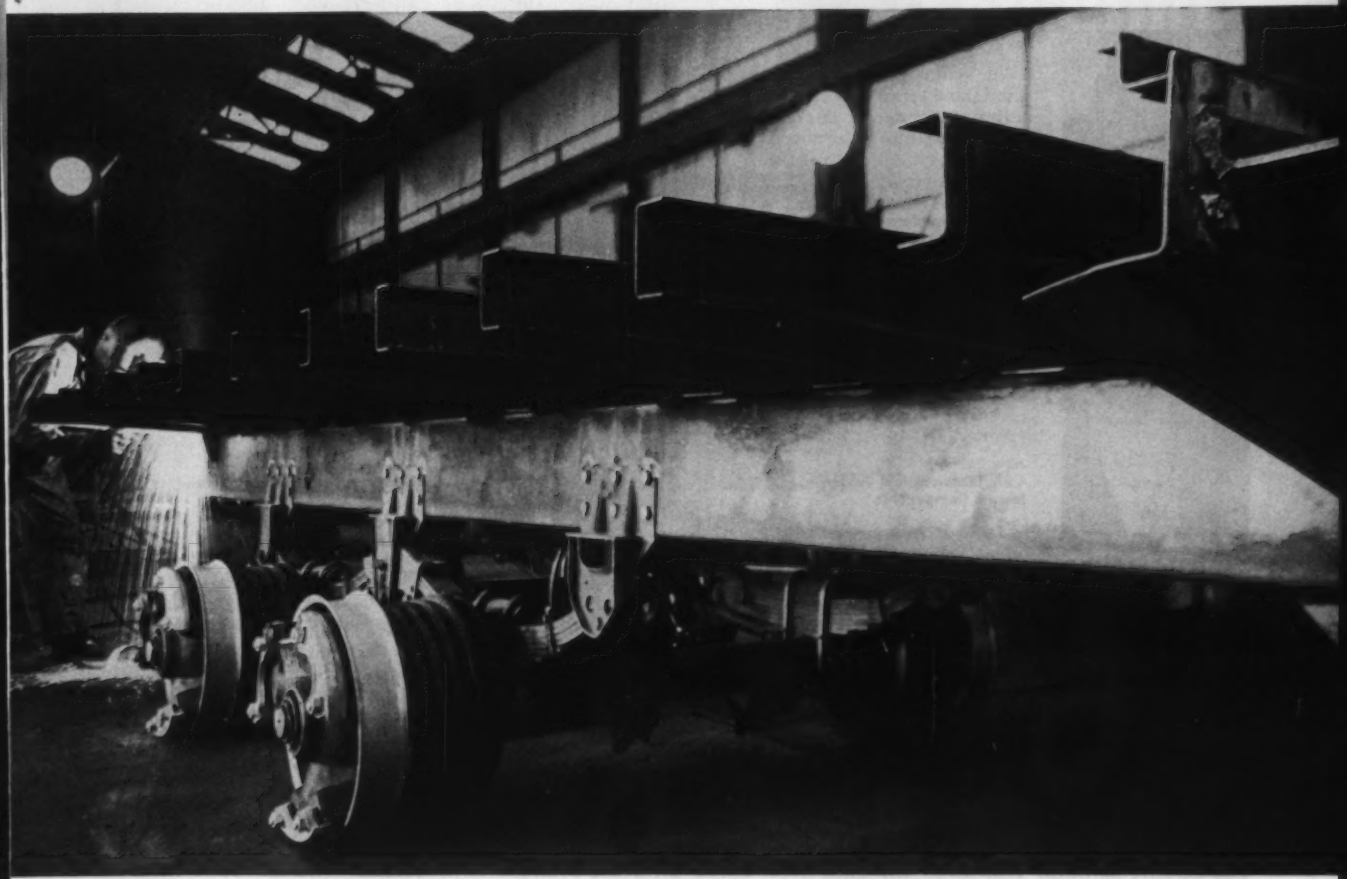
"About 60% of our production is directed to the individual customer's requirements. That's because we produce custom-made trailers. Now, several laws govern trucking throughout the United States. These laws dictate a truck's width, the number and arrangement of its axles, and its load-carrying capacity. Mountain states have special regulations for brakes and wheel types. For these reasons, we never know what specifications will be required in the next order. We have to purchase steel in small lots *as it's needed . . . where it's needed . . pre-cut to size."*

This account of how one company made substantial steel savings might never have happened, if Barnard & Leas Plant Superintendent, George Smith, hadn't taken the time to attend one of U.S. Steel Supply's Value Analysis Slide Presentations. But he *did.* And he became interested enough to take a long, cold look at his own steel-buying policies. Are you interested in the advantages of U.S. Steel Supply's Value Analysis Program? **Use the coupon on the following page.**

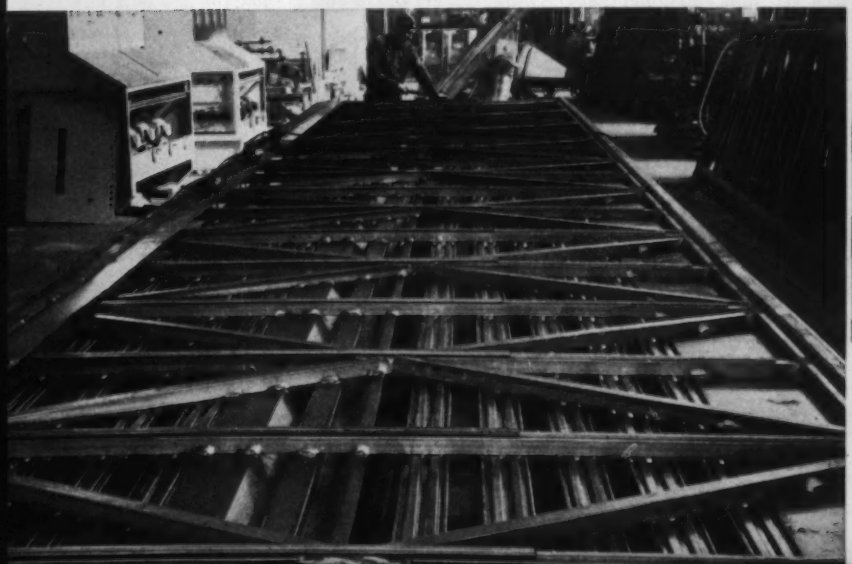
"Our company was founded a century ago to make grain processing equipment. Here are some components for a liquid fertilizer processing plant . . . and here is the finished product."



by dealing with U.S. Steel Supply."



"Our production ranges from processing machinery to trailers. This includes lowbeds, platforms, livestock, grain and special trailers. This man is working on the bed of a livestock trailer. This finished truck body is a completely mobile formula feed blender . . . an excellent example of our production work."



Here's how Value Analysis worked for these U.S. Steel Supply Customers:

"We reduced capital investment, eliminated scrap loss, slashed inventories, and brought our goal for a 60-day inventory turnover within range."

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"We consider U.S. Steel Supply's pre-cutting service a valuable asset. On one contract last year, this service sliced our labor costs 5%, or $12,500, by maintaining production schedules."

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"U.S. Steel Supply stocks a variety of material in 20 steel service centers located strategically all over the country. That's our guarantee against costly work delays!"

John Ziemba
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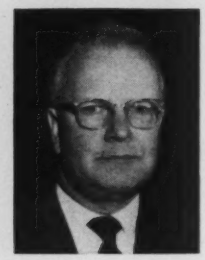
Dray Manufacturing Company



"Thanks to U.S. Steel Supply's prompt, efficient service, we plan to slice our steel inventory in half, and use the additional working capital for a wide-range car-reclaiming and rebuilding program."

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Manager of Purchases and Stores
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Fill in this coupon and send for your free Value Analysis Folder U.S. Steel Supply has prepared a form that may help you find the cost of maintaining your present inventory. It includes a number of cost items that should apply to your operation, and you may be able to add several others. Ask for this form—and when you receive it, be sure to pass it on to your cost control department and have them fill in your costs item by item. Then call your local U.S. Steel Supply representative for a comparative price run-down on material and special services. We think you'll find that U.S. Steel Supply will be able to show you how to reduce costs and increase profits.

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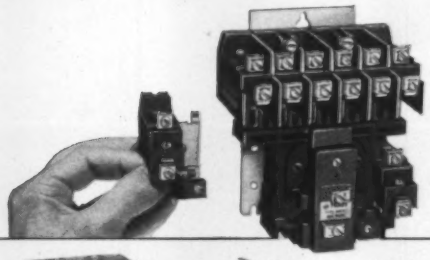
Why not give yourself a real surprise! We refer to the ease with which you can convert the contacts of these Allen-Bradley Bulletin 700 Type BR control relays. Using only a screwdriver, contacts can be changed from normally open to normally closed (or vice versa) in seconds—without removing the relay from its mounting—or its wiring. This "on-the-spot" convertibility certainly suggests an appreciable moneysaving reduction in your relay inventories.

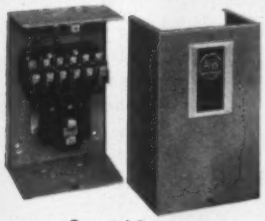
Extensive tests have proven conclusively that the Bulletin 700 Type BR relays are good for many—and we mean *many*—millions of trouble free operations. A "built-in" permanent air gap completely eliminates all possibility of magnetic sticking. Naturally, the double break, silver contacts never need attention. Also, the molded coil is your assurance that even the most severe atmospheric conditions cannot cause trouble. Please write for full details on these relays today!



BUT HEAR THIS!

In the event that when "on-the-job" it is discovered that something was either overlooked or added, the standard Bulletin 700 Type BR—either 2, 3, 4, or 6 pole relay—can easily have added to its base, out in the field, either one or two switching poles. It is done as easily as "falling off a log."

FIVE RELAYS
IN ONE
This shows how a Type BR relay can be arranged —in seconds—to do the job of five different relays.
3 N.C.—1 N.O.
3 N.O.—1 N.C.
4 N.C.
2 N.O.—2 N.C.
4 N.O.



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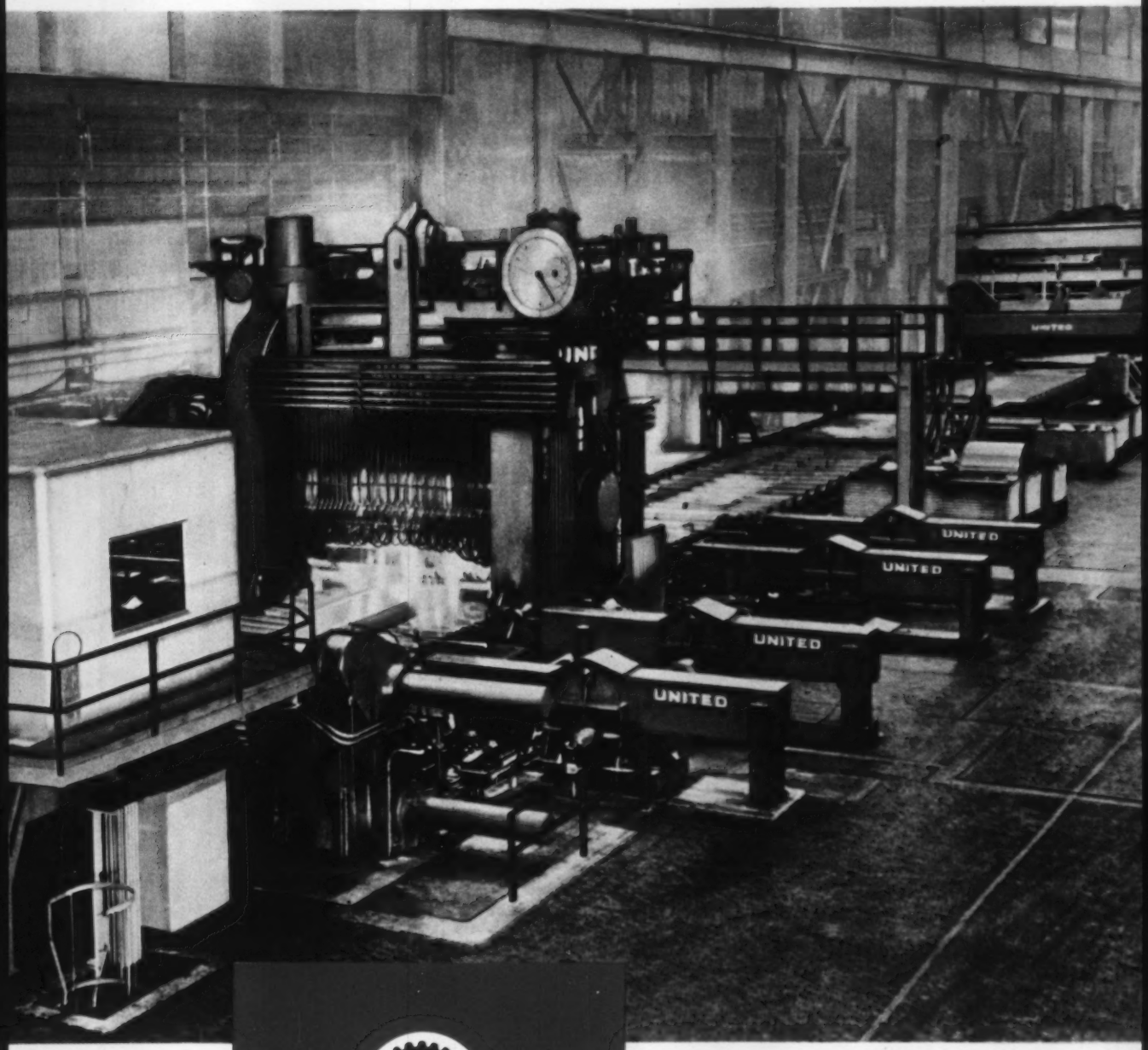

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Producers of alloys, metals and chemicals

VANCORAM

OR HOW TO DEGREASE MORE PARTS PER DOLLAR OF CLEANING COST

Every time they needed more vapor-degreasing solvent, the drum was empty, it seemed.

At first it didn't bother them much. Then, suddenly, they realized what was happening to their degreasing costs.

The solvent wasn't lasting as long as it should between bath cleanouts. That's why they had to use so much of it. Worst of all, every time a bath went sour they had to pull the degreaser off the line. That is where the real expense was lurking: in slowed-up production.

PSP TO THE RESCUE They solved the puzzle—with a degreasing solvent that can't wear out prematurely. It has permanent staying power—psp—because it's protected by a stabilizer that doesn't get used up during degreasing.

You stand a good chance of getting lower metal-cleaning cost with this solvent, too. It's called Nialk TRICHLOR. You don't have to add fresh stabilizer to it. Even when you distill the solvent, it remains stable. Even the vapor is stabilized. And you use less solvent, because less goes down the drain in unnecessary cleanouts.

Interested in finding out what you can save with this better trichlorethylene? Your Nialk TRICHLOR distributor can give you swift service on the quantity you need. Call him today.

NEW 36-PAGE BULLETIN explains fully how you get more and better vapor degreasing for the money with Nialk TRICHLOR. Shows basic types of vapor degreasers. Discusses cycles, operating procedures, stabilizers, causes of solvent contamination, solvent recovery, trouble shooting. Ask your distributor for a copy or write us.

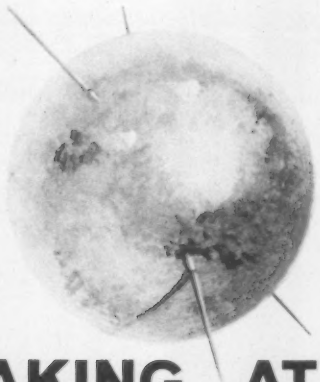
Nialk® Trichlor, a product of

HOOKER CHEMICAL CORPORATION

1206 Union Street, Niagara Falls, New York

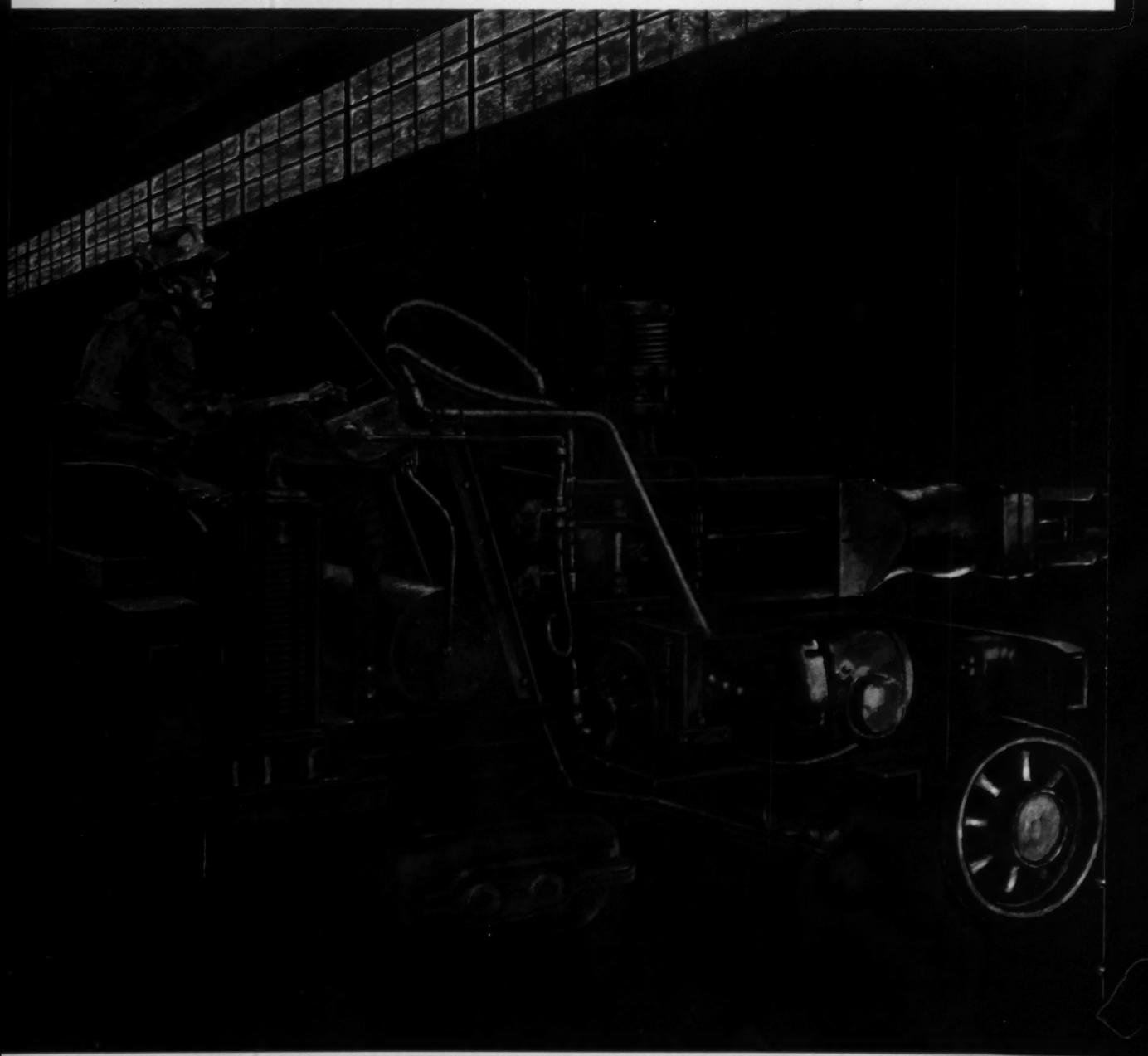
Sales Offices: Buffalo Chicago Detroit Los Angeles New York Niagara Falls Philadelphia Tacoma Worcester, Mass.
In Canada: Hooker Chemicals Limited, North Vancouver, B. C.

HOOKER CHEMICALS PLASTICS



STEELMAKING AT JESSOP

. . . A Proud Inheritance That Benefits You



It takes a lot of know-how and attention to infinite detail to launch a U. S. space satellite. Everything's got to be as near perfect as humanly possible. That's why the scientists and engineers who design our missiles look to Jessop for quality steels.

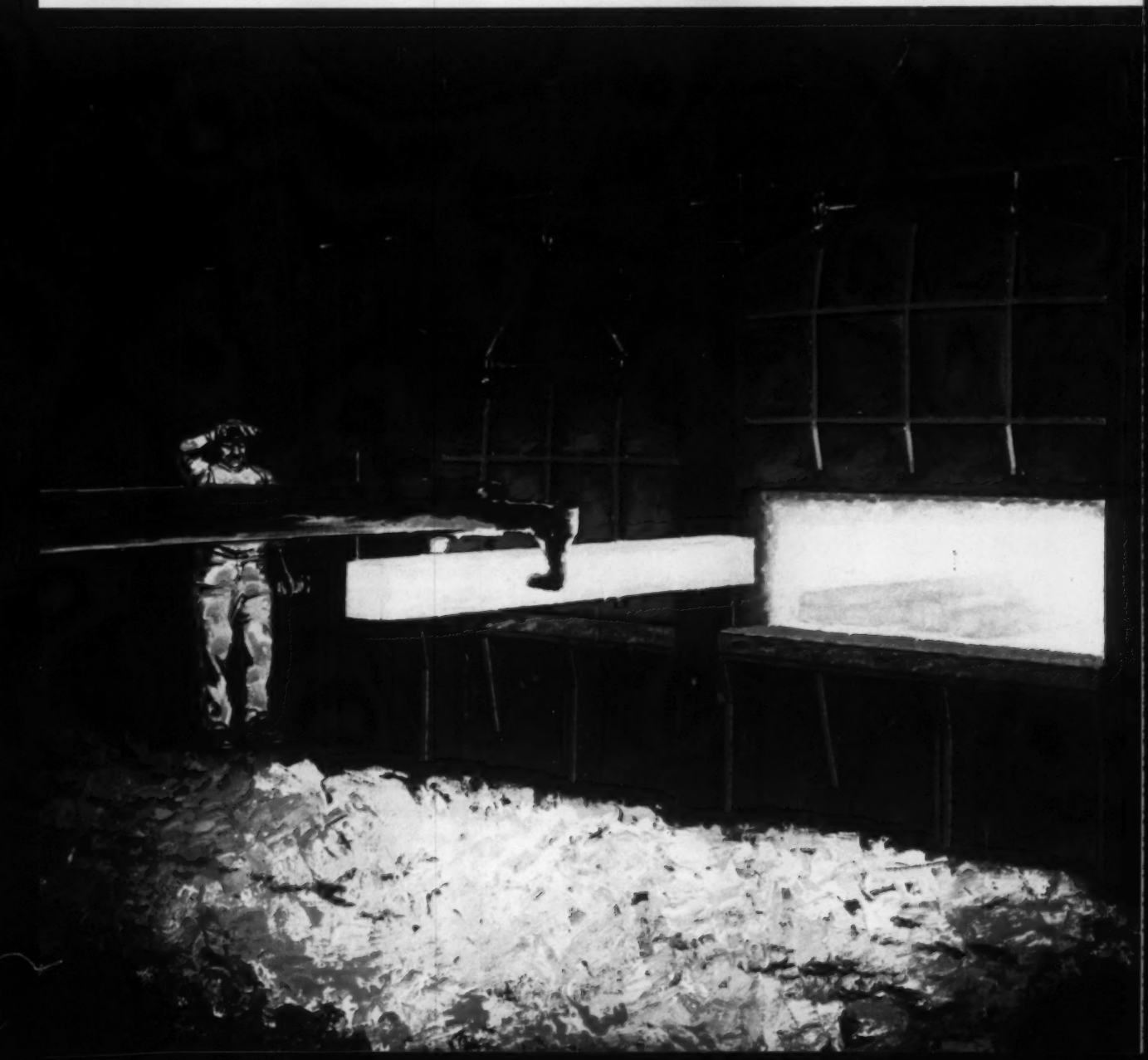
Jessop makes heat, corrosion, abrasion and shock resistant steels, non-magnetic and precision ground steels, high speed, cast-to-shape, clad, stainless and alloy steels and many others. And behind every pound of steel you order from Jessop is a well-deserved reputation for excellence of product.

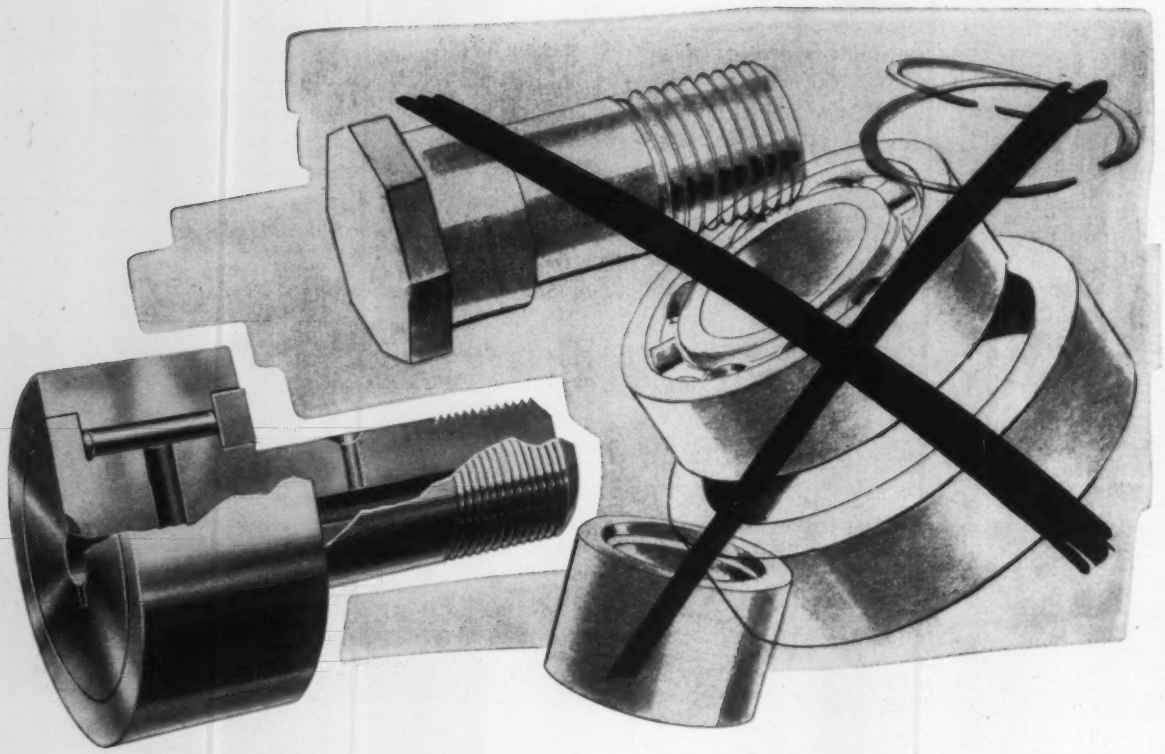
The name Jessop has been synonymous with quality steels since 1774. Today, backed up by generations of experience, Steelmaking at Jessop is a proud inheritance—an important plus factor you should consider when buying steel.

Jessop now has six plants and service center locations in the United States and Canada with general sales offices in 23 major cities of North America. Why don't you pick up your telephone, call a Jessop office and discuss *your* needs for specialty and alloy steels.

GENERAL OFFICES: Washington, Pa. **PLANTS AND SERVICE CENTERS:** Washington, Pa. · Los Angeles · Chicago · Detroit · Owensboro, Ky. · Wallaceburg, Ont.

JESSOP
STEEL COMPANY





McGILL® CF *CAMROL*® bearings

eliminate the cost of producing and assembling improvised cam follower, track and guide roller units

THESE CAMROL ADVANTAGES SOLVE COST, DESIGN, PRODUCTION AND PERFORMANCE PROBLEMS:

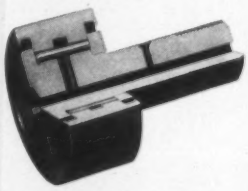
• AVAILABILITY • INTEGRAL UNIT CONSTRUCTION • HIGH LOAD CAPACITY • SMALL RADIAL SPACE REQUIREMENTS • HIGH SHOCK RESISTANCE • PRECISION ACCURACY • SIMPLIFIED LUBRICATION

You can simplify design and cut cost with CAMROL, precision cam followers. Procurement, production and assembly of components for improvised units are eliminated when you specify CAMROL bearings that are available from stock.

McGill developed the original roller bearing cam follower and perfected the CAMROL design through 25 years of application experience. Its full type construction provides exceptionally high capacity in an integral unit of a flanged, specially heat treated stud and heavy shock resistant outer race. Grease lubrication is simplified. Plain bearings require constant oil lubrication and bolt mounted ball bearings races crack under equivalent loads.

Precision construction, including concentricity of stud to outer race OD, provides accurate alignment of machine members. Ease of interchangeability and dependable operation in any cam action, track, guide or support roller application is assured. Use the CYR series in the same roller diameters for shaft mounting.

PRE-LUBRICATED SEALED CAMROL BEARINGS



These bearings combine the advantages of CF and CYR series bearings plus effective sealing against dirt, dust and grit. Ideal in applications where lubrication is a problem. Black ferrous oxide finish resists corrosion in contaminated areas.

CAMROL bearings are available in standard roller diameters from ½" to 4". Capacities to 20480 lbs. at 100 RPM.

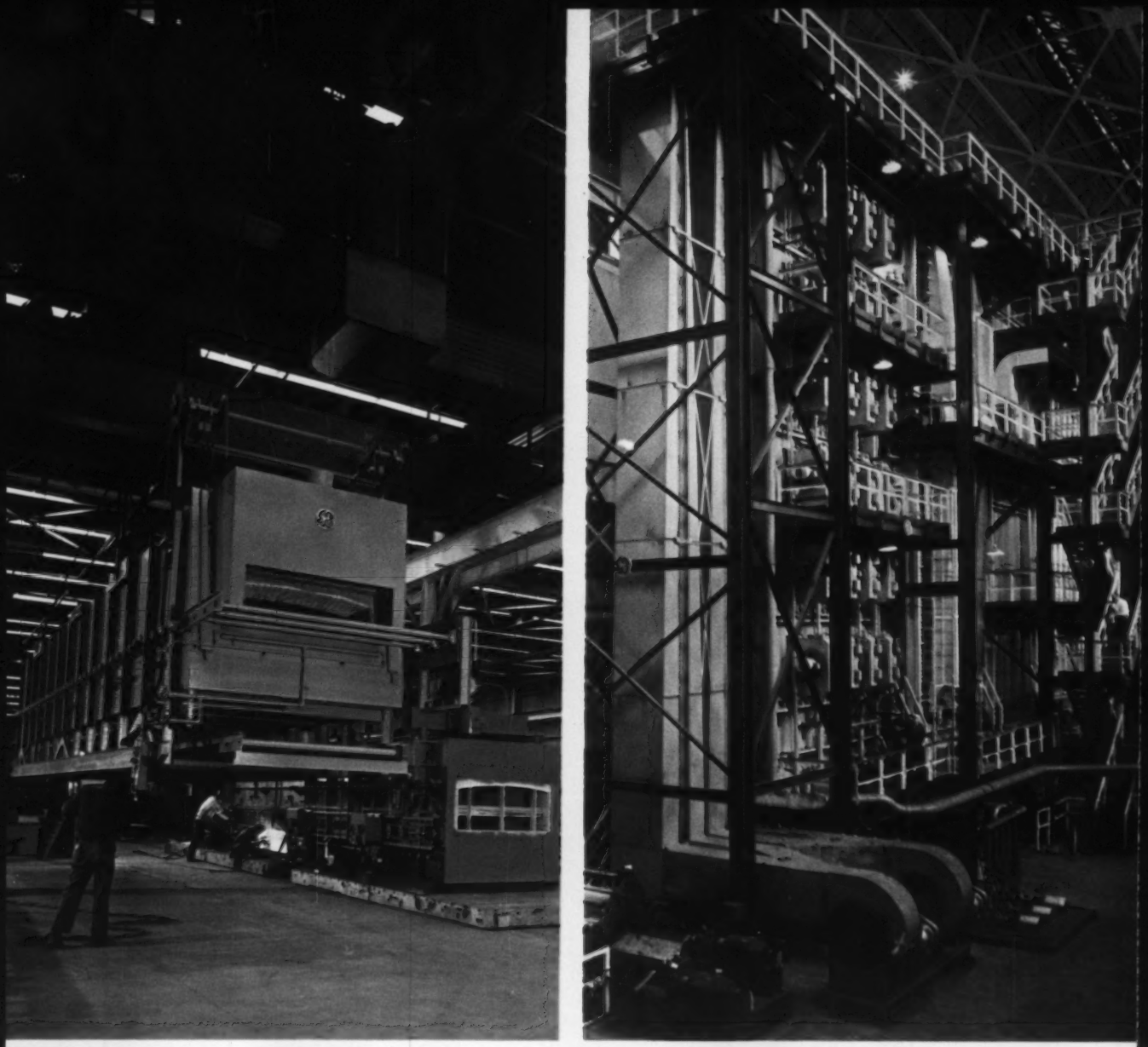
WRITE FOR FREE CATALOG NO. 52-A

engineered electrical products

McGILL®

precision needle roller bearings

McGILL MANUFACTURING COMPANY, INC., BEARING DIV., 301 N. LAFAYETTE ST., VALPARAISO, INDIANA



Spacious Shelbyville, Ind. plant allows complete assembly of large furnaces (left) and sub-assembly of major components for units too large to ship assembled.

HEAT
from General Electric

How General Electric saves you furnace assembly dollars . . . speeds start-up

From smallest lab furnaces to largest tower furnaces, gas or electric, you can save both time and money by having all or part of the assembly done in General Electric's Shelbyville, Indiana plant. G.E.'s spacious, modern factory has facilities to assemble the largest equipment which can be transported to the installation site.

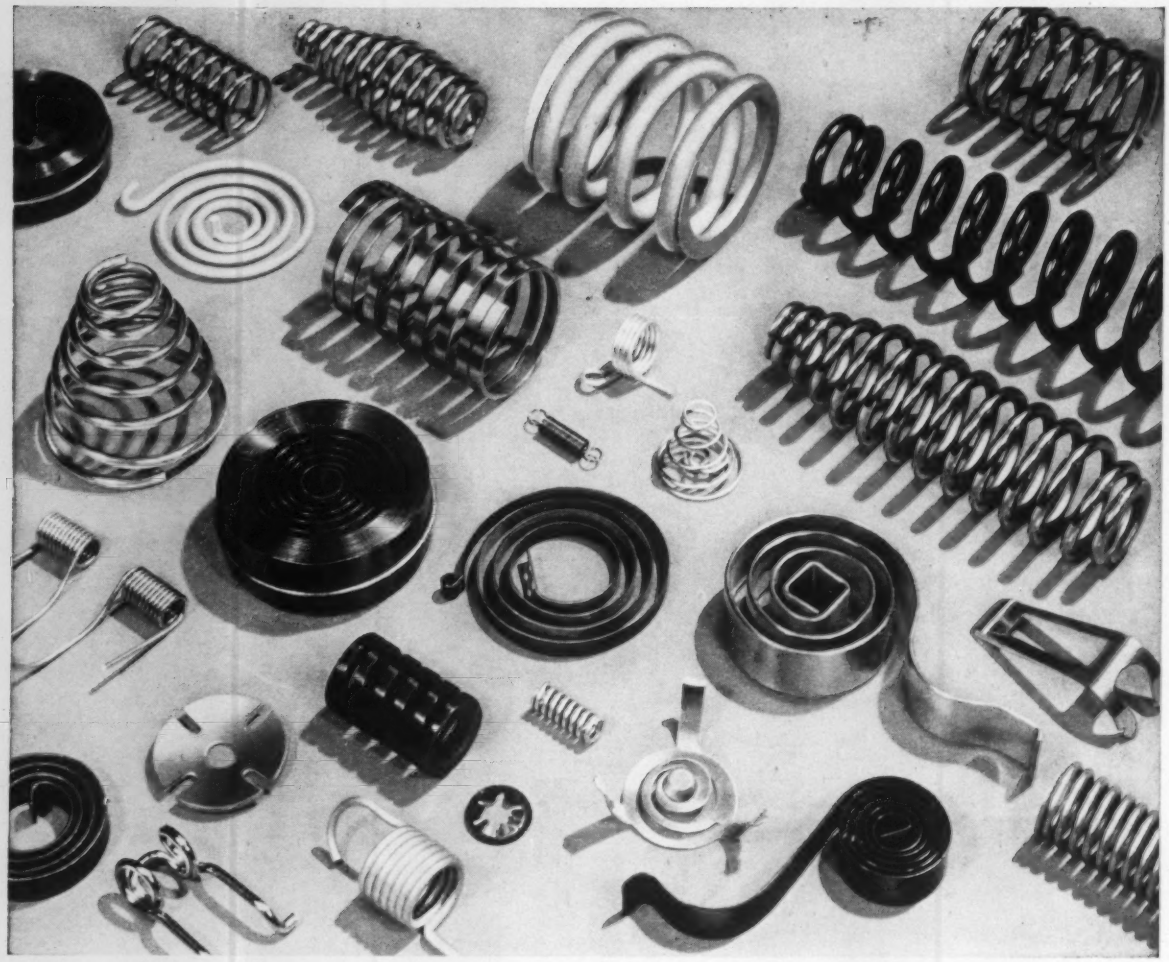
Your savings are greatest if the entire furnace is assembled in the G-E factory. There's less interference with your operations; you hire less part-time labor; and your furnace is assembled by experienced specialists, directed by design engineers.

Even if your equipment is too large to ship assembled, you can still save by having major sub-assemblies fabricated in the G-E plant, then shipped to your site for final erection. Either way, General Electric provides supervision or complete installation at your plant.

Example: By having major sub-assemblies manufactured in the General Electric plant, an Eastern steel mill was able to start up a 100-foot long, 65-foot high G-E continuous furnace just over four months after construction began.

For fastest, most economical furnace installation, take full advantage of G.E.'s "added value" of factory assembly. Call your nearby General Electric Apparatus Sales Office. 721-33

GENERAL ELECTRIC



Which of these did you use today?

Alarm wake you this morning? Stove timer work all right? Did you drive to work . . . take a business trip by air . . . press a light switch . . . use a dictating machine . . . or home workshop motor? Then you, or someone in your home or business, used a spring. With a product-mix like this it's practically certain that we enter your daily living, tucked anonymously away in nationally known and respected brands of all sorts of articles.

Write for a copy of "How to Solve Your Spring Design Problems" to learn how early consultation with the spring manufacturer results in improved design and performance.

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FORK LIFT TRUCKS, CARRIERS AND TRACTORS SINCE 1919

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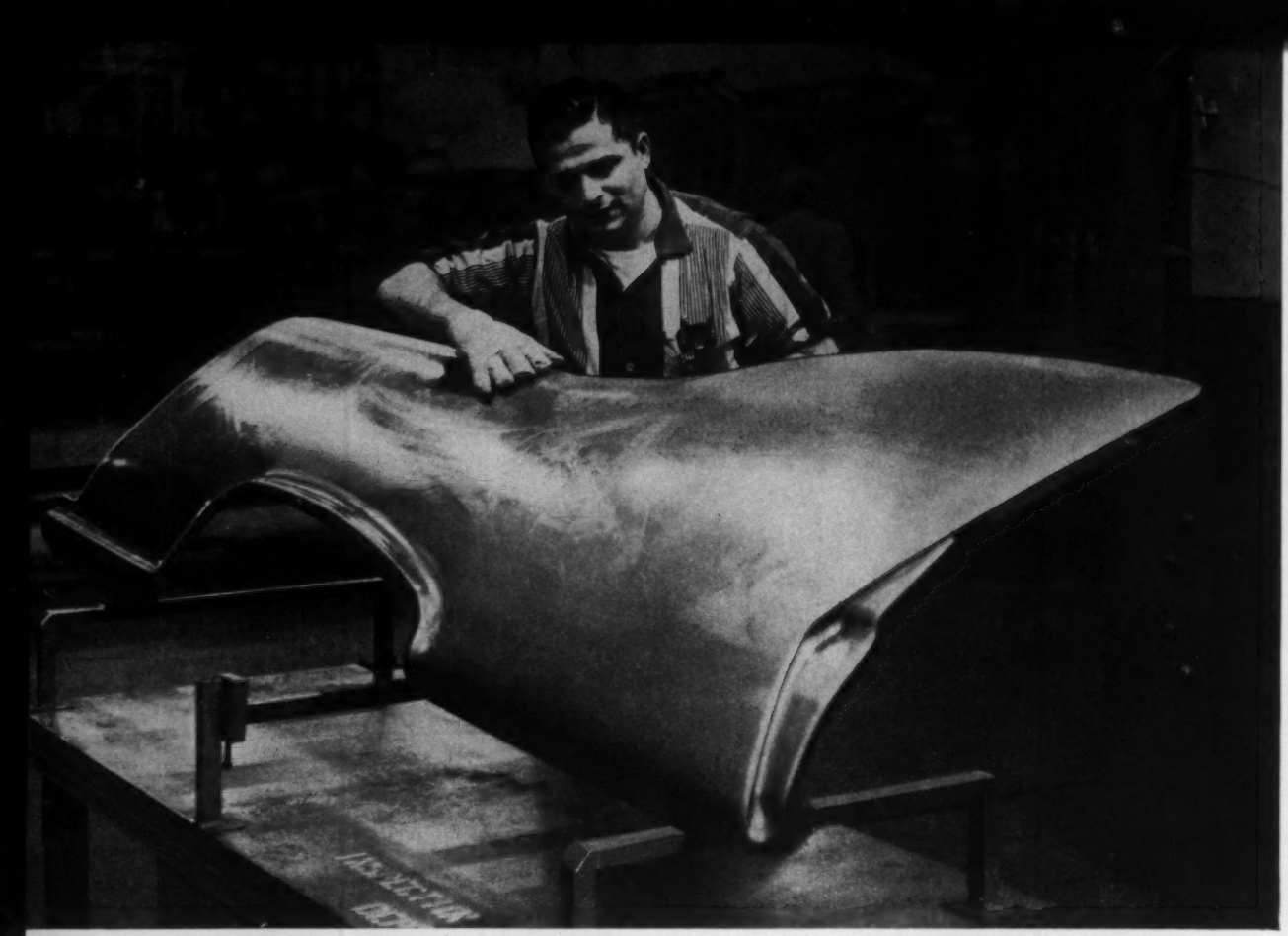


One of the largest and most difficult of some 600 stamped parts produced at Chrysler Corp's. Twinsburg (Ohio) Stamping Plant, rear quarter-panel of Plymouth two-door hard-top shows performance results of Pittsburgh Steel's drawing quality sheet under tough forming conditions.

Pittsburgh Steel Sheet Helps Chrysler Corp. Build 'Solid '60' Plymouths

There's more than meets the eye in the distinctive fin styling on the "Solid '60" Plymouth.

First, they're no longer simply fins—they've been given a performance job in Chrysler Corporation's new "unit construction" assembly to help reduce driver steering effort in normal highway travel.

Second, there is another performance story behind the aero-dynamic sweep of Plymouth's rear quarter-panel of which the stabilizer, or fin, is a part. It's the performance of Pittsburgh Steel Company's cold rolled sheet under stress of severe deformation in a complex die-forming operation.

Pittsburgh's drawing quality steel used for this part must, at one time, produce a deep curved draw for the panel's saddle, a shallow draw for the wheel housing and a severe dog-leg draw for the tail light area.

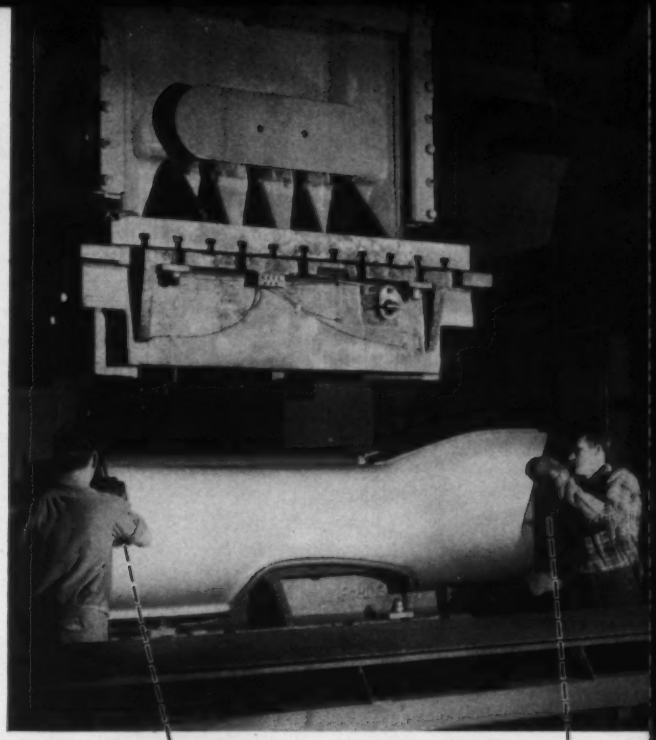
Simultaneously, it must have sufficient ductility to prevent buckling in the drawn areas and uniform flatness to achieve a stiff panel which resists a "pop-pop" oil can effect under pressure. Otherwise, an additional operation would be required.

Finally, the formed panel must emerge without flex marks, strain marks or breaks to provide a mar-free surface ready for finishing.

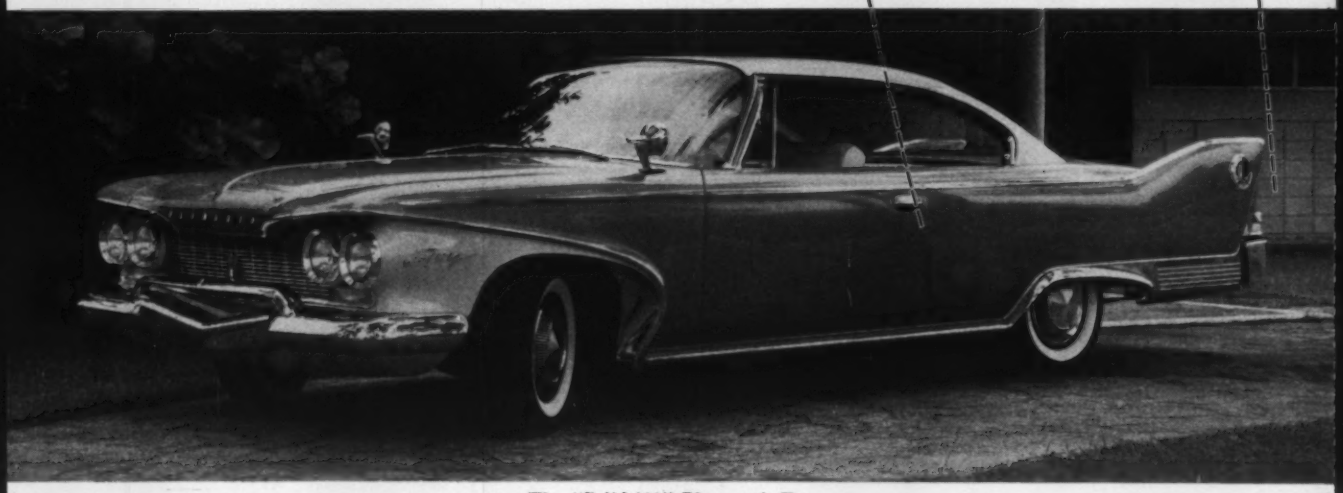
Pittsburgh Steel each day proves its drawing quality sheet can perform within these rigid requirements at Chrysler's big Twinsburg (Ohio) Stamping Plant where some 600 stamped parts are produced for all Chrysler "big car" models.

Besides being one of the most difficult parts to form, the rear quarter-panel (rear fender) of Plymouth's two-door hardtop is one of the largest stamped parts produced at Twinsburg.

To meet the performance standards established by Chrysler, the steel is precisely



Steel blank measuring 110 by 47 by .041 inches is fed into big toggle press above for die-forming operation that will produce basic shape of rear quarter-panel. The ductility and the flatness of Pittsburgh Steel's cold-rolled sheet are critical here due to severe deformation. Drawing quality sheet, with properties metallurgically matched to forming requirements, produces this sleek panel (right) that provides distinguished rear quarter styling and stabilizing feature for Plymouth's 1960 two-door, hard-top model (below).



The "Solid '60" Plymouth Fury.

controlled from open hearth to temper mill by Pittsburgh Steel's veteran steelmakers. They achieve the chemical composition, ductility, hardness, grain size, flatness and finish required in steel to form the part.

And that's where Pittsburgh Steel's field metallurgists also serve Chrysler — by studying every die-forming operation to determine exact properties required to achieve peak performance in the stamping process, in assembly and ultimately on the road.

The result: steel with metallurgically controlled drawing qualities matched to the part's forming problem.

The performance benefits of Pittsburgh Steel's drawing quality sheet will work for you, too. Metallurgical practices and services developed by nearly 60 years of steelmaking experience enable Pittsburgh Steel to produce flat rolled with the precise properties your operation requires.

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

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IS ALWAYS ON THE BALL

Your packaging operation can't get to first base without steady container delivery. So make Gaylord your mainstay—because Gaylord's 16 plants all over the country pitch in to keep your boxes coming, day in and day out, when you want them, where you want them.

Don't let erratic supply throw you a curve. Call your nearby G-Man now, and get him on your team.

CROWN ZELLERBACH CORPORATION
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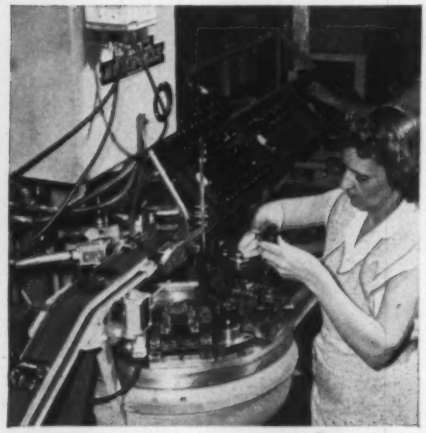
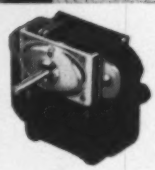
DENISON Multipress installation pays off for BARBER-COLMAN with faster, simplified small motor assembly that...

CUTS COSTS



DENISON 4-TON HYDRAULIC MULTIPRESS *is used by Barber-Colman to assemble low-cost precision AC motors.*



PREDICTED cost cuts have been *confirmed* by the installation of three Denison Multipresses at Barber-Colman Company in Rockford, Illinois.

Justified by MAPI (Machinery and Allied Products Institute) formula analysis, these presses operate in a line connected by belt conveyors. Semi-automatically, Multipresses perform bending, staking, aligning, compressing, riveting and stamping operations in the production and assembly of small precision electric motors.

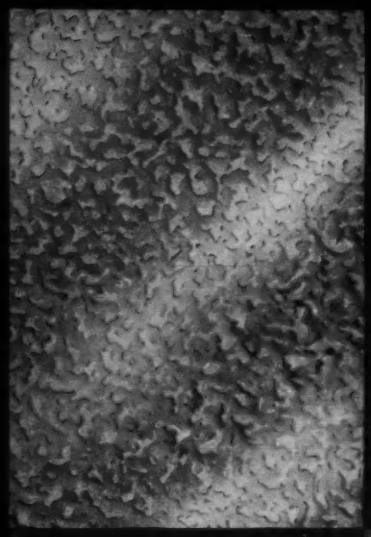
In addition to more efficient handling of production functions, other Multipress *bonus benefits* include—product uniformity... reduced scrap loss... rapidly adjustable stroke length and pressure for faster, simpler set-up... longer die life to lower tooling costs and downtime.

Duplicate these savings and bonus benefits in your plant today! Your Denison Production Specialist can show you how with a **M**ultipress **A**nalysis **P**rogram that can **MAP** new savings for you now.

DENISON ENGINEERING DIVISION
American Brake Shoe Company
1180 Dublin Road • Columbus 16, Ohio

HYDRAULIC PRESSES
PUMPS • MOTORS • CONTROLS

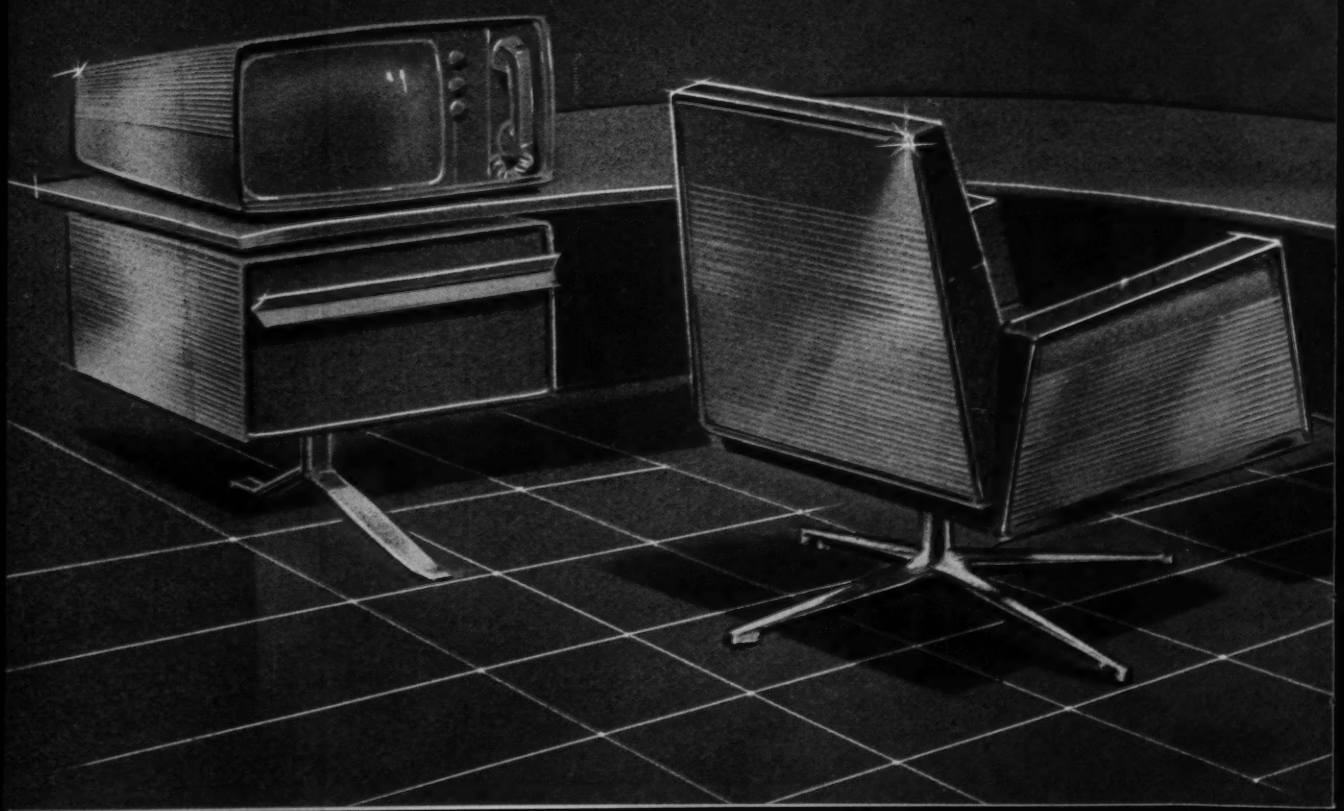
DENISON
HYDRAULIC MULTIPRESS



Donald Deskey has been a leader in the industrial design field for more than 30 years. A pioneer in the modern design movement in the United States, Mr. Deskey's influence has helped to bring stability, scope and depth to the profession and is reflected in services rendered to an impressive list of well-known companies.

The Donald Deskey Associates creative staff is one of the largest in the industrial design profession, embracing experts in package and product development, planning, diversification studies, materials research, manufacturing methods and processes, architecture, corporate identification, and marketing analysis.

New Deskey office furniture designs feature mark-resistant patterned

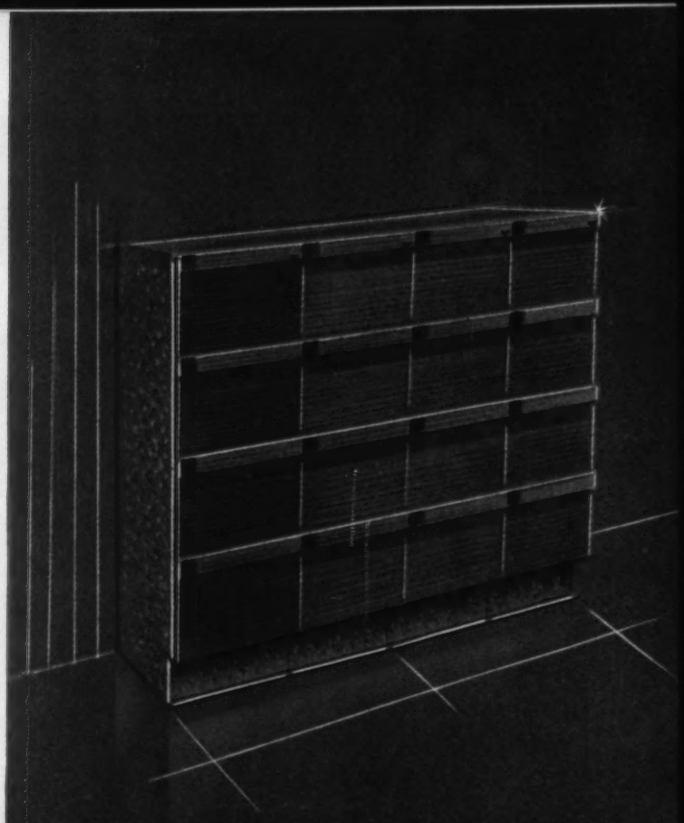


Design versatility is clearly apparent through the combination of Sharon Stainless Steel and Sharonart® in this modern office furniture group by internationally famous designer Donald Deskey.

Colorful, efficient, long-lasting office furniture is the result of combining the beauty of Stainless Steel and the luxurious texture and mark-resistance of Sharonart®.

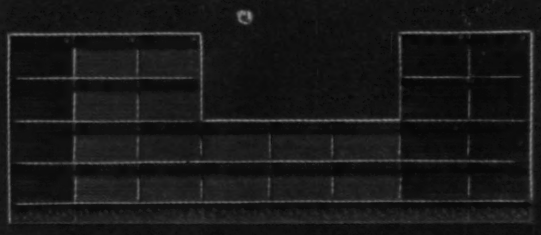
Stainless is available in bright or satin finish, or with Sharonart® patterns.

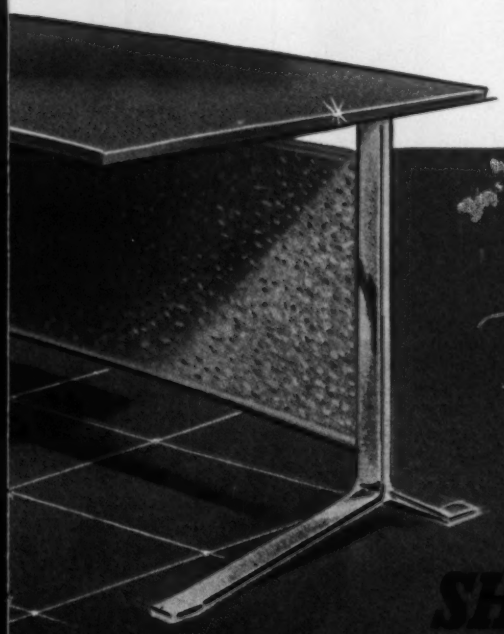
Sharonart® can be produced in an almost limitless number of patterns. Made of carbon steel, Sharonart® forms easily in standard forming equipment. It can be painted, plated or vinyl coated with beautiful results. For more information on Stainless Steel or Sharonart® write *Sharon Steel Corporation, Sharon, Pa.*

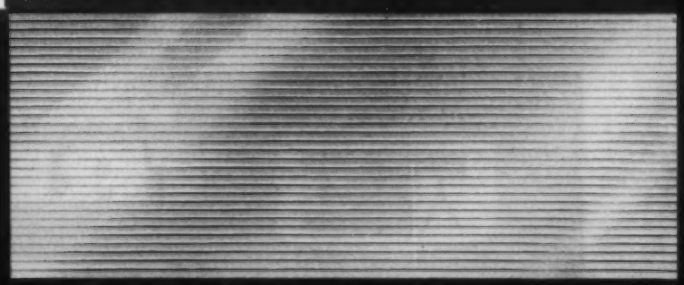


SHARONART

The products pictured on this page are in design form only. They were developed by Donald Deskey Associates, one of America's most respected designers of modern furniture.







SHARON *Quality* STEEL

Steel

TREADWELL COOLING BED

built in tandem, each over 100 ft. long. Each bed will cool 125 tons of 4" x 4" steel per hour.

For heavy duty and efficient production, this steel company called on Treadwell Engineers. The result . . . these Treadwell Cooling Beds are efficiently operating day in and day out.

If you have a machinery problem, call on Treadwell Engineers.

Pictured above: Treadwell Cooling Beds at work in an eastern steel mill.

TREADWELL

ENGINEERING COMPANY • EASTON, PA.

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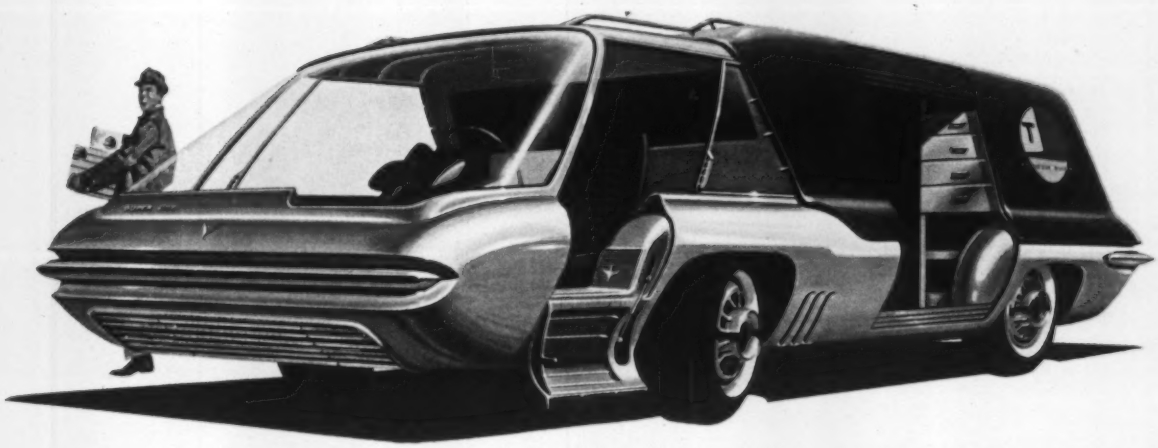
stainless steel

No other metal has the strength, beauty and versatile qualities that serve you so well today and promise so much for tomorrow.

There is nothing like stainless steel for THE AUTOMOTIVE INDUSTRY

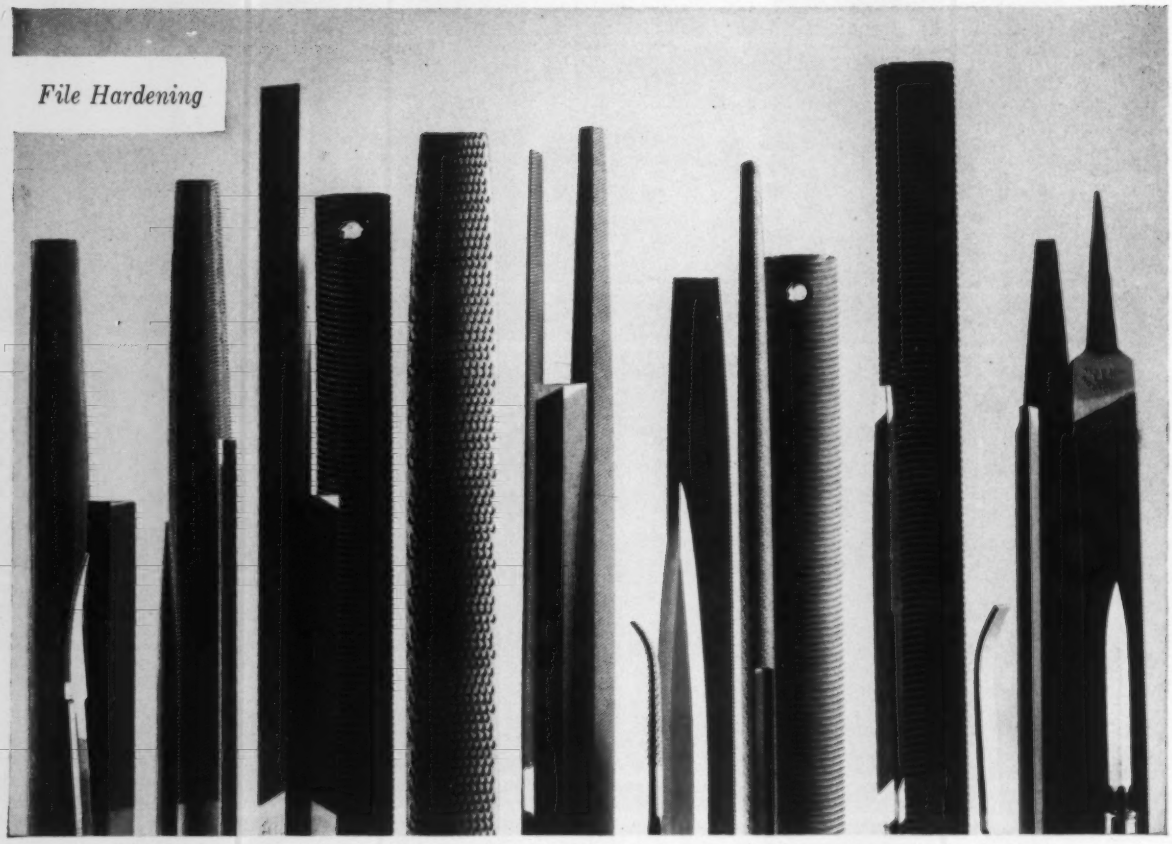


McLouth Steel Corporation,
Detroit 17, Michigan

Manufacturers of high quality Stainless and Carbon Steels

Look for the **STEELMARK** on the products you buy.

McLOUTH STAINLESS STEEL



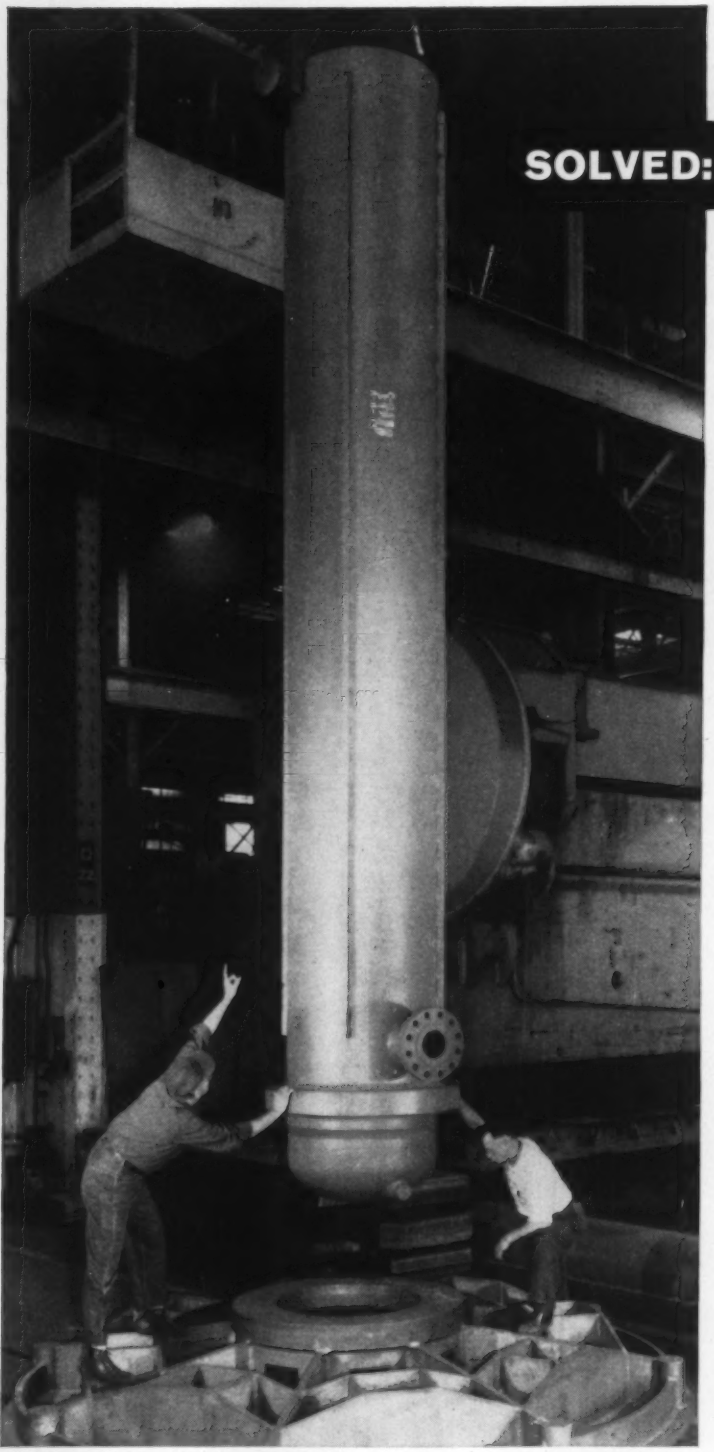
Nicholson File Co.: Many thousand files are hardened daily; Speedomax control helps keep rejects to absolute minimum.

Control of lead pot temperatures a problem?

Not at Nicholson File Co., Anderson, Ind., where Speedomax® H controllers are holding critical hardening temperatures to within ±5 F. With file hardening an art, Speedomax H permits a skilled operator to devote all his attention to producing a hard, straight, undistorted file. Since installing automatic control, *rejects have been minimized . . . pot life has increased substantially . . . new-operator training time appreciably reduced.* Rugged, compact and completely reliable, Speedomax H is providing similar process benefits on numerous other heat treat operations . . . is helping both to modernize production and to produce a quality product. Whatever your heat treat, it'll pay you to investigate Speedomax H! For details, contact your nearest L&N office or write 4957 Stenton Avenue, Philadelphia 44, Pennsylvania.

With automatic control holding pot temperatures to within ±5F, skilled operators can devote all their attention to producing files which consistently meet maximum hardness and straightness specs.

LEEDS Instruments NORTHRUP Automatic Controls • Furnaces



Blaw-Knox workmen assembling one of two constant pressure type accumulators built for two of America's largest steel mills. Sandusky supplied the straight cylindrical sections for both.

SOLVED: by Sandusky Centrifugal Casting

Blaw-Knox chooses 10-ton SANDUSKY CASTING for giant slabbing mill

When an 18½-foot cylinder was needed for a new giant Universal slabbing mill built by Blaw-Knox Company's East Chicago (Indiana) Works for a well known steel mill, they found that the most practical and economical way to meet all requirements was with a Sandusky Centrifugal Casting.

This 10-ton carbon steel cylinder, 32" O.D. with a 3½" wall, functions as an accumulator in the mill's hydraulic roll balancing system. Essentially a pressure vessel, it simultaneously supports the ram and ballast weighing 226 tons—the weight required to develop constant operating pressure of 1000 p.s.i.

"Only a dimensionally stable, one-piece cylinder could perform satisfactorily in this service," a Blaw-Knox official asserted. *"Distortion could lead to binding, loss of pressure and costly downtime. Sandusky's ability to produce this heavy walled cylinder in one 18½ foot length met all our requirements of cost, stability, and strength."*

Sandusky cylinders up to 33 feet long —from 7" to 54" O.D.— and in a wide range of ferrous and non-ferrous alloys —may well be the answer to *your cylindrical problems,* too.

Write to us at Sandusky, Ohio. Ask for latest Bulletin #200.

SANDUSKY CENTRIFUGAL CASTINGS
FOUNDRY & MACHINE CO.

5901

SANDUSKY, OHIO—Stainless, Carbon, Low-Alloy Steels—Full Range Copper-Base, Nickel-Base Alloys

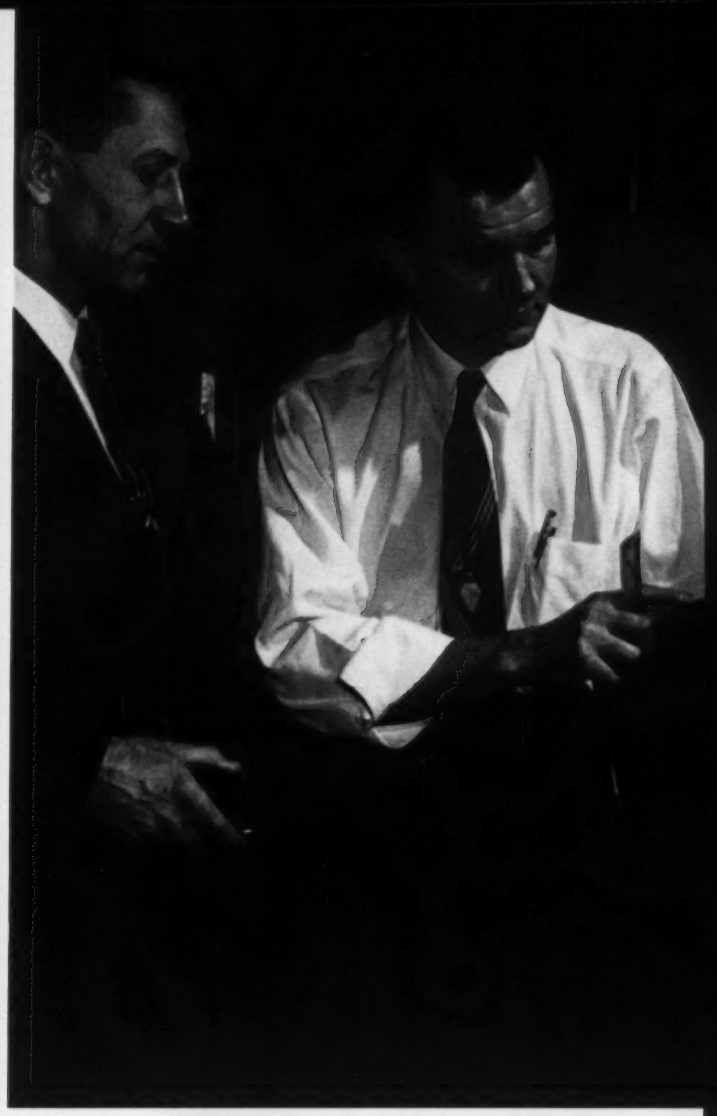
Iron Fireman Manufacturing Company changes to Gulfcut® oil,

GULF MAKES THINGS

A machining job that had been a problem for years was the test given a Gulfcut oil at Iron Fireman Manufacturing Company, Cleveland, Ohio. The job was hobbing 78-tooth, combination 6-8 pitch main drive gears of UMA-3 forging steel. Until the test, hobs had to be reground after every eight gears—once every cutting cycle.

By using Gulfcut 21C oil, Iron Fireman engineers found that they could get the same tolerances and the same production as before, and that they could cut approximately 30 gears or nearly 4 cycles before re-grinding. In addition, they were grinding one-third less off the hobs than before!

"With 275% increase in hob life, we're getting pretty close to optimum on this job," says Stanley J. Kovac,



At right, C. J. Wires, of the Production Engineering Staff, Iron Fireman Manufacturing Company, with T. F. Irving, Gulf Sales Engineer who recommended Gulfcut.

More than 300 kinds of steel, cast iron and brass gears are hobbed by Iron Fireman Manufacturing Company, all with the aid of Gulfcut oils. Pictured here is a 12-tooth, 6 pitch Ledloy steel pump drive gear, O.D. 2.333, tolerances +.0000, −.0015. Oil is Gulfcut 21C.

increases hob life 275% . . .

RUN BETTER!

Chief Production Engineer. "Performance like this has proved Gulfcut oil to us. We're now using it on all gear cutting operations. We cut 300 kinds of gears, of brass and cast iron, as well as steel."

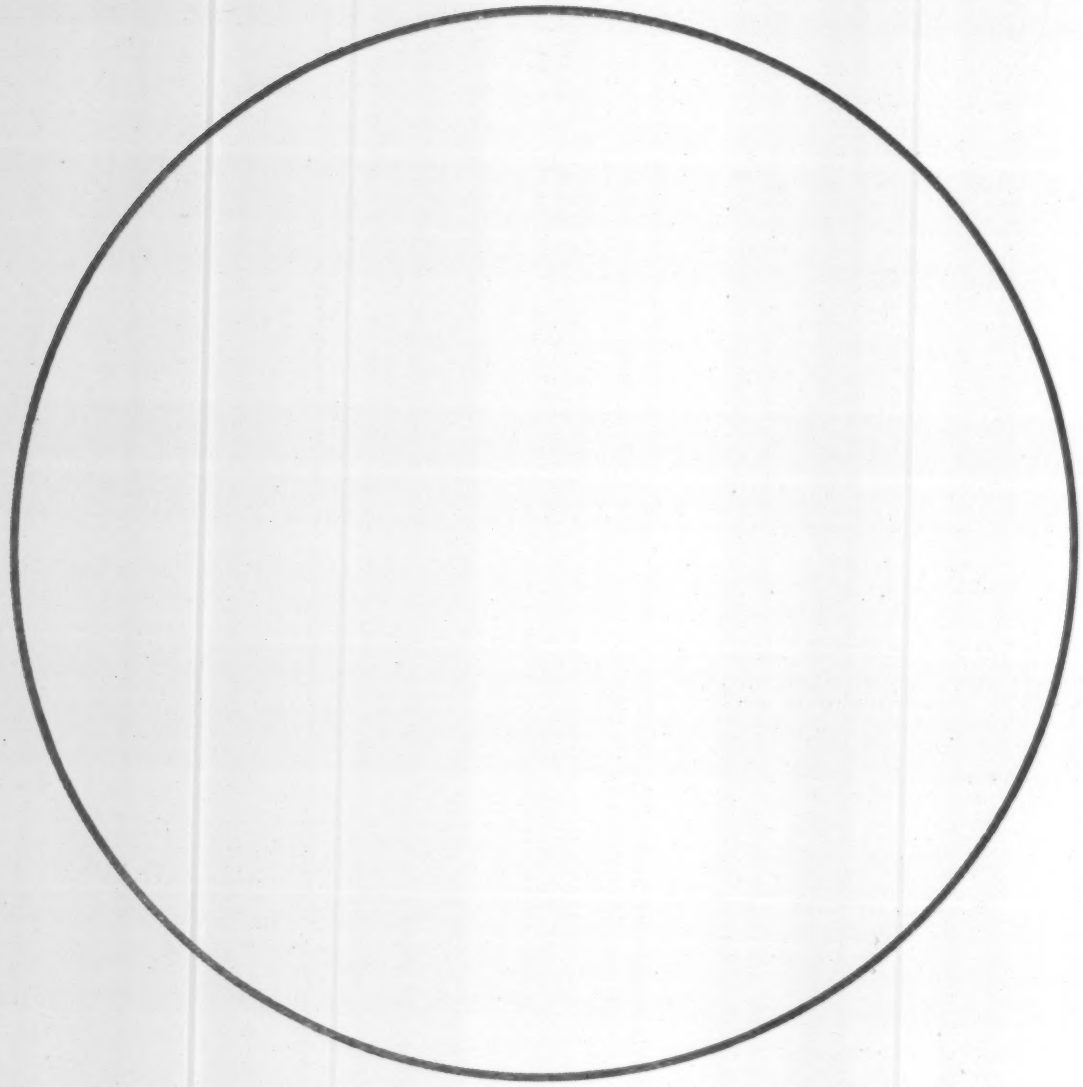
Do you have a tough machining problem? See how Gulf makes things run better! Just call a Gulf engineer at your nearest Gulf office.

GULF OIL CORPORATION
Dept. DM, Gulf Building
Pittsburgh 30, Pa.

GULF

SP-9822

(Advertisement)



How many segments can you cut this circle into with four straight lines?

The first quick answer is, of course, eight. Obvious—but not the whole answer!

Actually you can make as many as 11 segments with just four straight lines. Looking beyond the obvious *often* pays dividends. At Ryerson we've made a science of this—and call it *Metalogics*.

How does Metalogics work for you? It helps you value-analyze any kind of problem in the selection and application of steel, aluminum, plastics, and metal-fabricating machinery. It searches out money-saving and money-making ideas and shows you how to apply them. And then it follows through with day-in-day-out service that also goes "beyond the obvious" in caliber and scope and dependability.

Ask your Ryerson representative to show how you can get the greatest possible value from this unique Ryerson service. He'll be glad to tell you—and you may be very glad you asked. (Incidentally, for answer to the segmented circle see page 217.) Joseph T. Ryerson & Son, Inc.—Service Center Plants Coast to Coast.

STEEL
The Metalworking Weekly

Metalworking Week®

June 13, 1960

Steel Imports Jump 85% This Year vs. Last

First quarter imports of steel mill products totaled 1,400,367 net tons (vs. 757,555 net tons in 1959's first quarter), the American Iron & Steel Institute reports. It means foreign steel is coming into the U. S. at the rate of 5.6 million tons annually (vs. only 4.4 million last year). Big gains are coming in plates, sheets, strip, structural shapes, pipe, and tubing. U. S. exports in the first quarter inched up to 528,000 tons from 507,000 in the like '59 period. If the last three quarters match the first period, the U. S. will be a *net importer* of 3.5 million tons of steel mill products this year. (PAGE 195)

Steel Chief Cites Rush Orders, Sees Better Business

"Nearly every order we get now is marked 'urgent,'" reports E. P. Severns, chairman and president, Continental Steel Corp., Kokomo, Ind. He believes that customer inventory cutting has "pretty well run its course." He says orders are on the rise due to a stepup in construction activity. And he notes that orders for fencing and roofing for farm use are increasing. He believes both orders and shipments in June will exceed the April and May levels, but will be lower than the June, 1959, total. "I don't think it would be prudent to raise steel prices under current market conditions," he adds.

Wage Pattern Set; Rails Tackle Work Rules

Railroads granted the 16,000 members of the Order of Railway Conductors & Brakemen a 4 per cent wage boost, following an arbitration board's decision granting a hike of that size to 37,000 members of the Brotherhood of Locomotive Engineers. The way is now clear for negotiations on work rules. The 4 per cent wage hikes are expected to set a pattern for pacts with other rail unions representing around 740,000 workers. A Presidential board has recommended a 5-cent-an-hour hike for about 600,000 non-operating employees, plus liberalized fringe benefits.

Florida Gets a Steel Mill

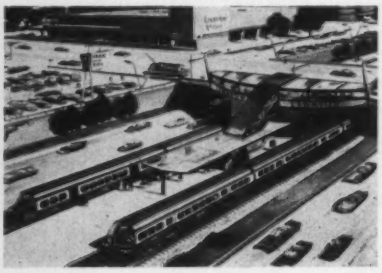
A steel rolling mill will be built in the Miami, Fla., area by Sovereign Resources Inc., New York. It will have an annual capacity of 75,000 to 90,000 tons of reinforcing bars and merchant shapes. Koppers Co., Pittsburgh, will handle the engineering. Completion is scheduled for April, 1961.

Round Trip to Mars: 347 Days

American spacemen may be pushing off to Mars and Venus by 1970-71, Krafft Ehricke, program director, Convair Astronautics, San Diego, Calif., told the American Society of Mechanical Engineers last week. He said a spacecraft carrying eight men could make a "look-see" flight to survey the surface and

atmosphere of the planets. The spacemen would not land, but would orbit about the planets, collecting data, then return to Earth. His schedule for round trips: 347 days to Mars, 542 days to Venus. He also suggests that the spacemen might hop from one spacecraft to another in small "taxicapsules."

Needed: Better Commuting Facilities



Fred J. Borch, General Electric vice president, called on business and civic leaders last week to spearhead a public educational program aimed at alleviating metropolitan traffic problems. Pointing out that present commuting facilities cause inefficient use of human and economic resources, Mr. Borch says: "Workers and industry both lose as it takes longer and longer for people to get to and from their jobs." At right, above, is an artist's conception of tomorrow's commuting system. At left is the new subway area in Toronto, Ont., where property values within two blocks of the subway increased three to seven times because of the project.

55 Million Pay Double Income Tax

Double paycheck deductions for income taxes affect almost one-third of the nation's population, says Commerce Clearing House, Chicago. Personal income is now taxed by 34 states; 21 collect through withholding, says CCH.

How Much Energy Does Your Job Take?

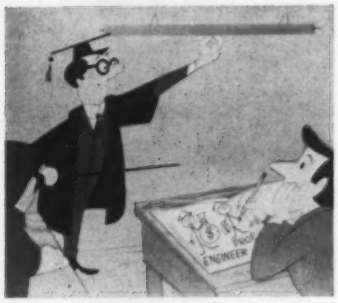
A Small Business Administration booklet lists these energy expenditures for common activities (in approximate calories per minute):

Sitting relaxed	1.5	General lab work	3.2
General office work (sitting)	1.7	Washing dishes	3.3
Standing relaxed	1.8	Plastic molding	3.3
Light assembly work	1.8	Cleaning windows	3.7
Medium assembly work	2.7	Toolroom work	3.9
Driving car	2.8	Bricklaying	4.0
Sheet metal work	3.0	Tractor plowing	4.2

Predicted: 500 mph Airplane Without Wings

An airplane without wings or tail may eliminate the problem of wasting considerable time getting to and from airports, two Ford Motor Co. engineers told the American Society of Mechanical Engineers meeting last week. The "levacar" can travel at 200 mph to 500 mph over tracks (similar to rails). Compressed air is fed to "levapads" which fit around the track, lifting the vehicle a fraction of an inch above the track, practically eliminating friction; forward push comes from an aircraft engine. The vehicle would be automatically controlled. Ford has built experimental models and is developing the idea.

Education Needs More Help from You



Teaching must be made a more attractive career to recruit promising college graduates. That's the theme of one of the new films (16 mm, color, animated, with sound) sponsored by the Council for Financial Aid to Education, which may be had on free loan. CFAE says industry has accepted the idea of aiding education but that the rate of giving is still on the lean side.

IBM to Open Computer School

This fall, IBM will open a "systems research institute" on United Nations Plaza in New York. Purpose: Train people to find computer system solutions to complex business and scientific problems. Curriculum: Workshops in systems planning, case studies in systems design, advanced programing, business simulation techniques.

Computers to Diagnose Illnesses—but How's Bedside Manner?

It's conceivable that after 10 or 20 or 50 years of development a physician can collect data on a patient, transmit it to a central agency where a computer could return an analysis stating the most probable diagnosis, the probability of it being right, the second most probable diagnosis and its reliability, and perhaps even recommend treatment. That's what Ohio State University's Ralph W. Stacy and Norman A. Coulter Jr. told the American Society of Mechanical Engineers last week.

Pension Plans Become More Liberal

In a study of pension plans covering 6 million employees, Bankers Trust Co., New York, finds these trends: Liberalized benefits . . . broader coverage . . . multiple plan programs . . . less restrictive eligibility requirements . . . employees permitted to receive early retirement pensions at their own election . . . provision for special pensions for totally and permanently disabled employees.

GE Offers Canadian Firms $100 Million in Subcontracts

General Electric Co. is holding $100 million in subcontract orders on a golden platter—asking Canadian companies to take a crack at picking them off. Canadian firms are to have "equal opportunities" with American companies for this and future GE defense contracts, says a GE purchasing executive.

Republic Kicks Off $1 Million Sales Training Program

Republic Steel Corp. has started a $1 million training program for stainless steel sales called the Order Makers Institute "to help distributors and their

salesmen become order makers rather than order takers." OMI, a series of nine meetings, will be held in headquarters and branches of at least 50 stainless steel distributors. Republic previously conducted OMI programs for its pipe and Truscon Div. distributors.

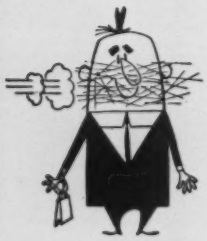
Navy to Build 7-Acre Radio Telescope

Sugar Grove, W. Va., will be the site of a radio telescope bigger than six football fields and higher than a 60 story building. It will be able to revolve 360 degrees and tilt from 0 to 90 degrees. North American Aviation Inc., which will build the giant, 7-acre, aluminum "dish," says the big ear is "the largest movable structure in the world."

Broader Role for Marketing Research Is Predicted

Marketing research may become "management research"—identical with problem solving on a broad front, Dr. Wendell R. Smith, director of marketing research and development for Radio Corp. of America predicts. The mature marketing research function operates like preventive medicine, he says. Its techniques are being used across a broad management front.

Straws in the Wind



Mellon Institute says it has developed a high strength, lightweight, alloy steel which will cost about 80 cents a pound to produce . . . Hughes Aircraft Co. will build an experimental ion engine for the National Aeronautics & Space Administration . . . Douglas Aircraft Co. and Bethlehem Steel's Shipbuilding Div. are working on a joint proposal for a 60 ft, antisubmarine, hydrofoil craft for the Navy . . . Continental Can Co. says the use of cans for soft drinks this year is 50 per cent greater than last year and another 50 per cent gain will come next year . . . The value of construction put in place in May totaled $4.5 billion—up 10 per cent from April, but down 5 per cent from May, 1959, the Commerce Department reports . . . General Electric Co. has produced a 7000 lb, thermal column case for a research reactor from aluminum . . . National Welding Supply Association says members' first quarter sales jumped 11 per cent above those for the like 1959 period.

Metalworking Pulse

The Business Trend: The dip of 11 points in the industrial production index for the latest period is traced almost entirely to the Memorial Day holiday. Except in times of strong upward pressures, this pattern is typical. **Autos:** Production last week regained most of the ground lost in the holiday week. Continuing good sales presage strong production schedules this month. **Steel:** The ingot rate turned up slightly from the low mark since the strike recorded a week ago.

- **INDUSTRIAL PRODUCTION**
  - Week ended June 4 .... 148†
  - Year ago 172
  - Details on Page 131
- **PASSENGER CAR PRODUCTION**
  - Week ended June 11 . 145,000*
  - Year ago 127,029
  - Details on Page 128
- **INGOT PRODUCTION RATE**
  - Week ended June 12 . 62.3%†
  - Week ago 60.6%
  - Details on Page 204

†Preliminary. *Estimated.

Copyright 1960 by STEEL, Penton Building, Cleveland 13, Ohio

He's Watching a Band Sawing Miracle

This band saw operator at the Bell & Gossett Company plant in Morton Grove, Illinois, is watching "Controlled Accuracy" . . . accuracy, being held to within a few thousandths of being perfectly straight, and he can actually *see* the band blade being guided in the saw cut to produce this accuracy; No further machining is required before the pipe is welded into an assembly for a Bell & Gossett Heat Exchanger Unit.

Band sawing accuracy like this is nothing short of miraculous — especially when it can be done on a high production basis, as Bell & Gossett is doing. And when the same tolerances can be held on cut-off pieces from 2" to 18" in diameter, this MARVEL #81 Band Saw Machine can be truly called a precision machine tool.

The secret of this amazing sawing accuracy is in the MARVEL "SURE-LINE" Automatic Accuracy Control—a simple and extremely effective electro-mechanical servo-mechanism that continuously senses and automatically corrects any tendency of a band blade to drift to either side of a desired line of cut. The "SURE-LINE" unit literally "steers" the blade to make a straight cut. This permits the use of heavier feed pressures and, when desirable, higher blade speeds, to do the work faster, without sacrifice of accuracy. Incorporated in the new MARVEL #81 Series High Speed Heavy Duty Hydraulic Band Saws, the "SURE-LINE" permits full utilization of all the advantages of high speed steel band saw blades—while extending their usable blade life as much as 50%.

Before you buy any band saw machine, get complete details on MARVEL #81 Series Single Cut, or Automatic Shuttle Type Bar Feed Production Band Saws—the machines DESIGNED AND BUILT TO REDUCE SAWING COSTS. *Write for catalog today.*

MMT-PE

ARMSTRONG-BLUM MANUFACTURING CO.
5700 West Bloomingdale Avenue • Chicago 39, Illinois

MARVEL Metal Cutting SAWS
Better Machines-Better Blades

Record breaking Atlas missile billows flame and vapor as she launches 4¼-ton satellite into orbit. Constructed of Type 301 Nickel Stainless Steel, Atlas is built by Convair (Astronautics) Division of General Dynamics Corporation. *U.S. Air Force photo*

130 tons of missile with a skin thinner than a window pane!

The Nickel Stainless Steel skin of the Atlas missile is actually about one-third as thick as the glass in your window.

And yet look what this skin does:

- It is the sole structural framework for Atlas—130 tons of dead weight at the moment of firing.
- It serves as the wall of the propellant tanks in Atlas' weight-saving design.
- It withstands the deep chill of liquid oxygen (—297°F) . . . the high heat of supersonic speed (400°F—600°F).

. . . And it is less than 1/25 of an inch thick!

No wonder they call stainless the space age metal. No wonder engineers turn more and more to Nickel Stainless Steel as temperatures rise . . . as speeds soar . . . as demands get more and more severe.

But Nickel Stainless Steel has many earthbound applications, too. Its strength and resistance to both corrosion and temperature extremes improves the performance and prolongs the life of many industrial products. And its attractive appearance provides still another reason for its popularity in products for the home.

What's your metal problem? Is it high or low temperatures? Corrosion, stress, fatigue or an unusual combination of factors? Write to us about it. Perhaps Nickel—or one of its alloys—can help you get it off the ground.

The International Nickel Company, Inc.
67 Wall Street New York 5, N. Y.

INCO NICKEL

NICKEL MAKES STEEL PERFORM BETTER LONGER

Labor on Trial!

Labor management is on trial.

The issue: Does it have the statesmanship required to handle the perplexing and disturbing problem of wage-price inflation?

Based on the evidence so far, the verdict will be: "Guilty."

Unlike business and industry, labor is a monopoly. It is in a position to demand—and get—a never ending list of wage increases and concessions.

The railroads, for example, will be obliged to pay 53,000 locomotive engineers, conductors, and brakemen 2 per cent wage increases on July 1 and again in 1961. About 740,000 other railroad workers are scheduled to get the same boosts. An equally serious matter, featherbedding, remains to be negotiated. To give you an idea of what it costs: Railroads pay $230 million a year to diesel engine firemen who merely go along for the ride.

Major rubber companies are being asked to discuss a general wage increase for 100,000 workers as a followup to the 10 cent wage settlement in 1959.

This fall, the electrical industry, including GE and Westinghouse, will face demands from the IUE for more employment security, improved pensions, and a 3.5 per cent wage increase.

The auto industry, with contracts expiring Aug. 31, 1961, will probably be asked for a profit sharing plan, a shorter workweek, higher wages, and improved benefits.

No doubt the steel industry will be asked for further concessions when new contracts come up for renewal July 1, 1962.

These examples demonstrate that the economic facts of life need to be brought home to every U. S. citizen.

More and more dollars in the pay envelopes eventually buy less and less at the supermarket.

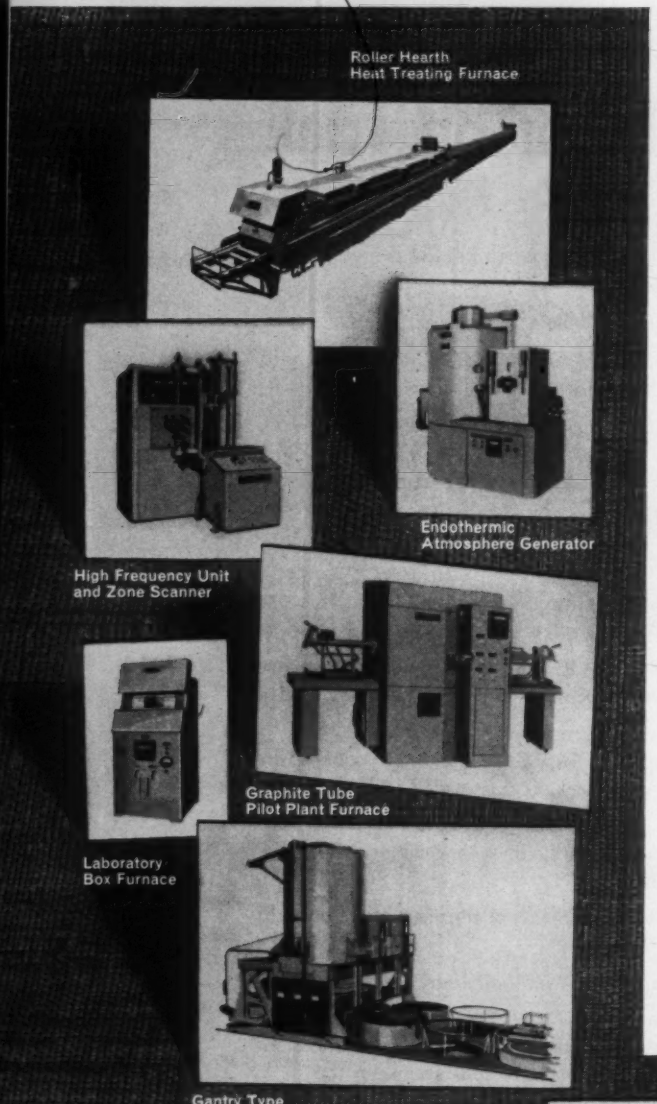
When the real facts are made known, the burden will be put on labor management to exercise the statesmanship needed to preserve jobs and keep the U. S. economy healthy. We wonder if it will be willing to meet the challenge squarely and sincerely.

Irwin H. Suckl

EDITOR-IN-CHIEF

THE BIGGEST INDUSTRIAL HEATING JOB CAN BE ENTRUSTED TO LINDBERG'S *PLUS* DIMENSION IN SERVICE

THERE'S LINDBERG EQUIPMENT FOR EVERY INDUSTRIAL HEATING NEED



The plus dimension in service Lindberg offers today can provide a complete answer to any problem requiring the application of heat to industry. Give us your specific requirements for a part or a product and we will develop the right processes, design, engineer and install equipment and facilities.

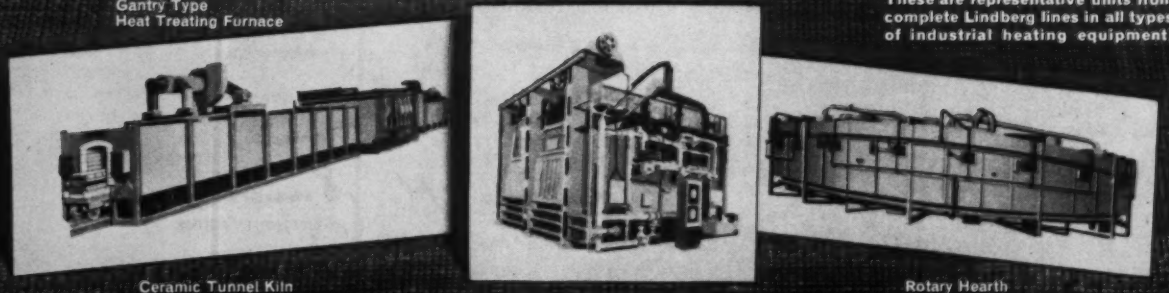
This service covers broad requirements—from plant layout and construction to automated production lines, or just specially engineered industrial heating equipment efficiently integrated into your production processes. For example, Lindberg Industrial Division has recently completed or is in the process of installing such varied projects as:

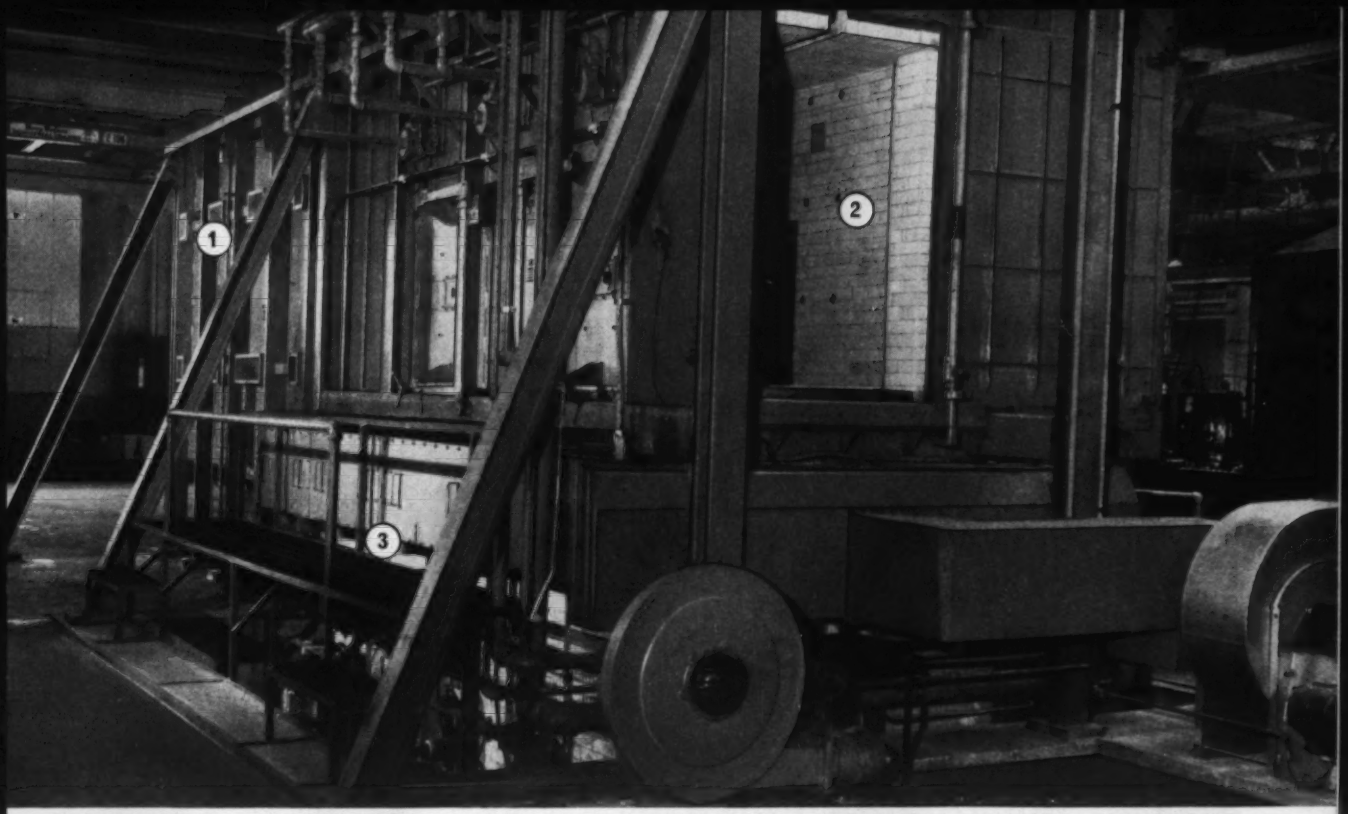
- Complete plant layout and equipment for brazing honeycomb
- Complete installation for heat treating raw aluminum products including furnaces, foundations, roof and lighting
- A fully automated production line for heat treating plow shares
- Two large ceramic kilns embodying a new concept of making high-refractory bricks
- Complete, automated production line for enameling and drying hot water heaters

You obtain many advantages from Lindberg. You get the combined skills of what we believe to be the country's finest group of engineers and technicians in the industrial heating field. Our experience covers the whole range of "heat for industry" methods so you can rely on us to recommend the most suitable equipment and processes. You will get your installation from one responsible source, guaranteed to achieve the results you need and ready to go to work at the turn of a switch.

Lindberg Industrial Division, Lindberg Engineering Company, 2321 West Hubbard Street, Chicago 12, Illinois. Los Angeles Plant: 11937 South Regentview Avenue, Downey, California. In Canada: Birlefco-Lindberg, Ltd., Toronto.

These are representative units from complete Lindberg lines in all types of industrial heating equipment.



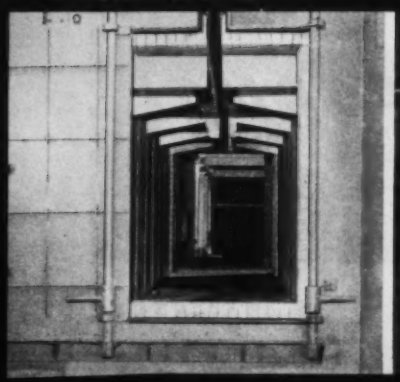


This Lindberg installation at Stewart-Warner Corporation, Indianapolis, combines (1) Pre-heat Furnace (2) Holding Furnace and (3) Lindberg-Upton Salt Bath Furnace.

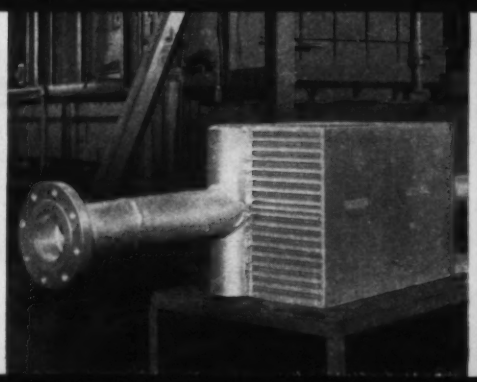
LINDBERG SUPPLIES COMPLETE INSTALLATION FOR DIP BRAZING ALUMINUM HEAT EXCHANGER CORES

Brazing large aluminum plate-and-fin heat exchanger cores requires close tolerances and precise controls. Stewart-Warner Corporation, Indianapolis, chose Lindberg Industrial Division to design and install the right equipment to perform this exacting process efficiently and economically. The main unit, shown above, combines Lindberg Preheat and Holding Furnaces and Lindberg-Upton Salt Bath Furnace. Cores are brought to the desired temperature, moved to holding furnace section, then lowered into the salt bath. Automatic controls maintain required salt bath temperature to extremely close limits. Brazed cores are raised to holding furnace for drainage, moved through a cooling chamber, steam cleaning booth and five dip rinse tanks for thorough cleaning. This installation is another example of the complete design, engineering and installation service Lindberg Industrial Division offers industry. Whenever you have a product or process requiring the application of heat, consult your local Lindberg Field Engineer, (see your phone book) or write us direct. Lindberg Engineering Company, 2441 West Hubbard St., Chicago 12, Illinois. Los Angeles plant: 11937 South Regentview Ave., Downey, California. In Canada: Birlefco-Lindberg, Ltd., Toronto.

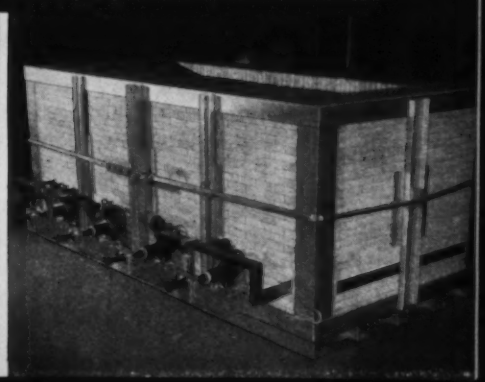
Design of unit permits convenient movement of cores through pre-heat (foreground) to holding section (at far end).

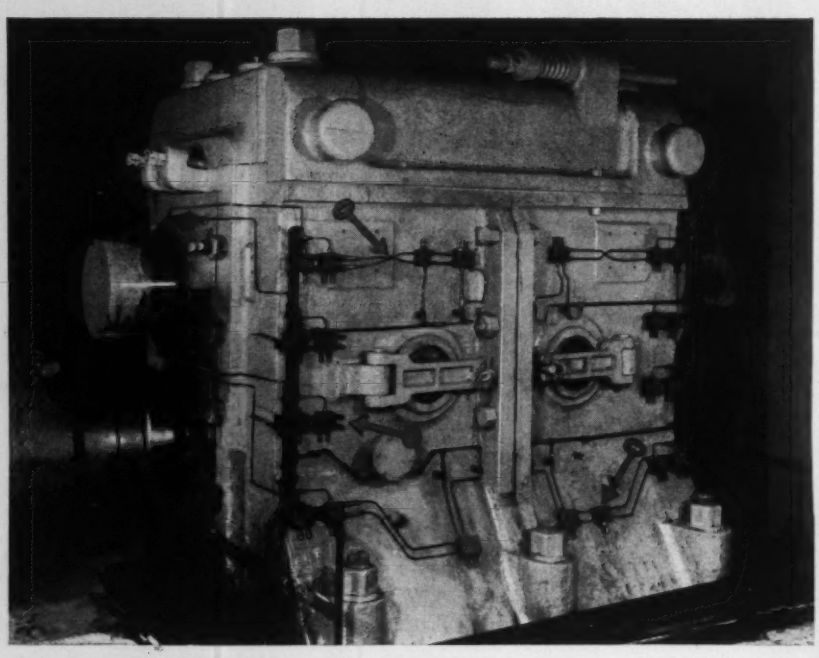


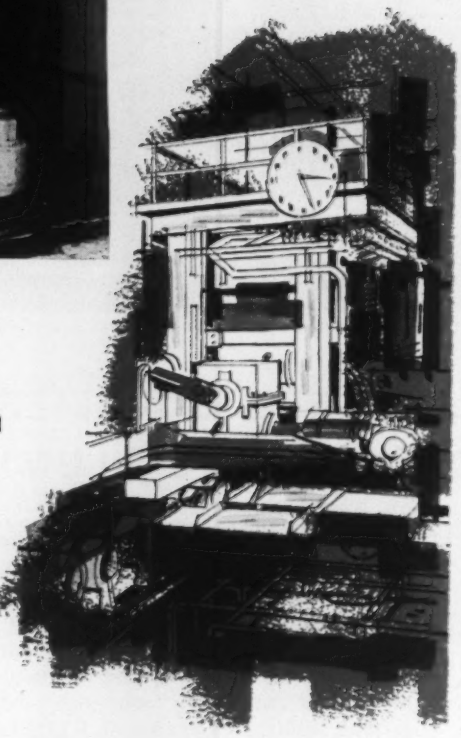
The aluminum heat exchanger cores being brazed in the unit have heat transfer surfaces of 8000 sq. ft. or more.



Lindberg-Upton Salt Bath Furnace in unit features exclusive Graphite "Continuing" Electrodes, and has a capacity of more than 12 tons molten salt.







Farval lubrication helps keep Acme Steel's blooming mill on 'round-the-clock operation

Here's the delivery end of a recently installed Farval air-operated time clock-controlled spray system. It provides dependable 'round-the-clock lubrication at 18 points for the internal gearing in this new blooming mill pinion stand at Acme Steel Company, Riverdale, Illinois. An engineered overflow arrangement returns the lubricant back to an air-operated barrel pump attached to a 400-pound drum.

Throughout Acme Steel's expansion program, eleven Farval systems are busy at work lubricating vital bearings on all types of production equipment . . . Steel plant engineers know from experience that Farval Dualine Lubrication Systems

- Increase Bearing Life
- Save Both Labor and Lubricant
- Enhance Good Housekeeping
- Keep Machines Operating Continuously
- Eliminate Hazardous Hand Lubrication

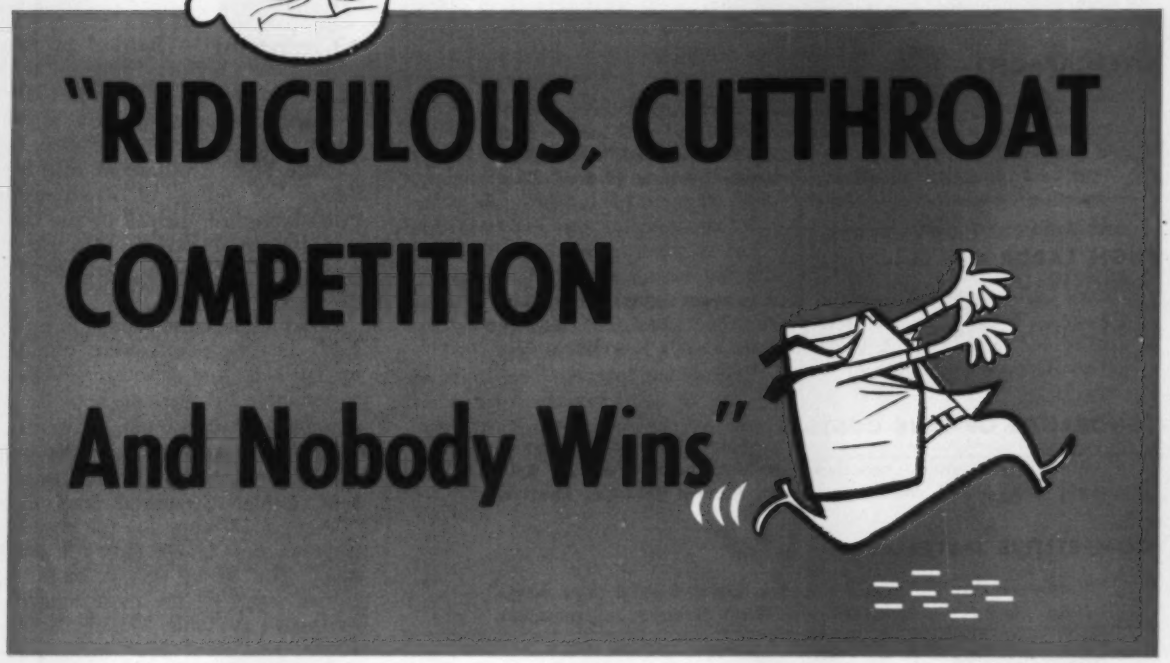
No wonder virtually every major steel producer chooses Farval for their heavy-duty lubrication requirements.

Get the complete cost-cutting story from your Farval representative—or write today for free revised Bulletin 26-T.

KEYS TO ADEQUATE LUBRICATION
—wherever you see the sign of Farval—familiar valve manifolds, dual lubricant lines and pump stations—you know rolling mill equipment is being properly lubricated.

Farval Studies in Centralized Lubrication No. 250

Farval Division • Eaton Manufacturing Company
3270 East 80th Street • Cleveland 4, Ohio



Steel Fabricators Ponder Their Plight

PRACTICALLY ALL structural steel fabricators will tell you they have knowingly bid for a contract at a figure below actual cost. But they do so with a variety of reactions:

• **Redfaced anger**—aimed at general contractors who play one fabricator against another . . . and at fabricators who let themselves be victimized.

• **Quiet resignation**—he knows it's ethically wrong and poor business practice, but feels he has to do it as a defensive measure.

• **Grim concern**—over the possible collapse of an old family business and the discharge of faithful employees with long years of service.

Ironically, business volume in the industry is good. Bookings in the first four months were 11 per cent ahead of where they were in the same 1959 period; shipments were up 2 per cent, backlogs 26 per cent. This won't be a record year (1957 shipments hit a peak 4.1 million tons), but shipments could come close to 3.5 million tons.

Profits are another story. "Prices are at least 20 per cent below where they should be," says T. W. Fauntleroy, vice president, Pittsburgh-Des Moines Steel Co. "In my 21 years in this business, I've never seen a worse pricing situation."

• **Buyer's Market** — A few years ago, it was a rarity when a building or bridge contract didn't go at a higher price than the architect's or engineer's estimate. Today, the reverse is generally true.

Example: U. S. Engineers recently awarded a contract for the construction of large tankage in Midwest. Engineers' estimate of project cost was $11.33 million. Bids ranged from a shade over $8 million to $11.3 million. Commented one disgusted bidder: "I'd bet my shirt the guy who got the contract will lose $2 million."

The nose-dive started two years ago. Fabricators look in wonderment at how it happened and why it has persisted. Fifteen fabricators are bidding on every job; there's no such thing as a firm, one shot bid.

• **How the Bidding Goes**—The procedure goes something like this: You're a fabricator, and you submit a bid to a general contractor at a fair price. You wait until a day or so before the contractor must submit his total project bid. Then you ask him how your bid stacks up.

He'll answer: "Well, Jack, you're

Is your industry vulnerable to the same . . .

Factors Creating the Profit Squeeze?

BUSINESS ETHICS—

"Because of our bidding practices, we're our own worst enemies." —R. L. Mullen, president, Lehigh Structural Steel Co., Allentown, Pa.

OVERCAPACITY—

"There's hardly a plant which hasn't expanded capacity. Conceivably, the industry could turn out 6 million to 7 million tons a year—we'll ship nearly 3.5 million tons in 1960."—L. Abbett Post, executive vice president, American Institute of Steel Construction Inc.

HIGH LABOR COSTS—

"We went out of the structural steel contract fabrication business because of high wages on low productivity." Leal C. H. McLean, chief engineer, Jones & Laughlin Steel Corp.'s Warehouse Div., New Orleans plant.

IGNORANCE OF TRUE COSTS—

"Many of the smaller, new firms just don't know what their costs really are."—C. J. Mosher, president, Mosher Steel Co., Houston.

COMPETITIVE MATERIALS—

"Prestressed concrete people moved in fast and did a good design selling job to the architects."—William Howard Jr., president, North Texas Steel Co., Ft. Worth, Tex.

FOREIGN COMPETITION—

"Foreign steel fabricators can now compete in world markets. Domestic firms that have lost foreign business are now scrambling to make up the loss in home markets."—T. W. Fauntleroy, vice president, Pittsburgh-Des Moines Steel Co.

HIGH MATERIAL COSTS—

"Perhaps the mills could revise prices downward to realistically meet competition."— Duane T. Molthop, president, Vierling Steel Works, Chicago.

not low."

You reply: "If I drop 10 per cent, will I be low?"

Returns the contractor: "Yes, that should do it."

End of conversation.

You're unhappy because you have wiped out all your profit, but it's better than nothing.

Then you recheck the contractor a few hours before he must wind up his bid.

Behold! You're no longer low, and you go through the routine again.

Suppose you survive the reverse auction, is your bid now safe?

It might not be. After the contractor has won the over-all contract, he might feel he can do still better by shopping around more—or some other fabricator might decide he can "still afford to lose" a little more.

Laments a Southern fabricator: "I once discovered I was cutting a bid on a job on which I was already the lowest bidder!"

There are many factors behind the price squeeze—many have parallels in other industries. Here are the key problem areas and how structural fabricators view their plight.

• **Overcapacity** — Sparked by the government's highway program and glowing projections of industrial and commercial expansion, most fabricators expanded their facilities in the mid-'50s. The outlook also attracted an influx of newcomers. Prices were firm, helped by the fact that structural steel was in short supply and fabricators could be selective in bidding on jobs.

Bookings began to tumble in mid-1957. Fewer projects were coming up for bids, and fabricators began to scramble for work to keep their new facilities operating. Prices fell.

"We were among those who expanded," relates R. L. Mullen, president, Lehigh Structural Steel Co. "Come on, I'll show you the biggest, emptiest, new bridge shop you ever saw." The 80 by 480 ft building houses some of the most modern equipment available. The day STEEL visited the plant four men were working.

• **Competitive Materials**—At the time fabricators were fighting the steel shortage and hustling to keep pace with demand, prestressed concrete began to make inroads. Promoted by an aggressive cement industry, it captured the eye of architects.

"Prestressed concrete people were able to offer both delivery and price appeal," explains L. Abbett Post, executive vice president of the American Institute of Steel Construction Inc. "The situation was ideal for them to accomplish inroads in three years that would have normally taken ten."

Comments one fabricator: "Part of it is our own fault. We haven't done much in the way of keeping pace designwise and helping the architects and engineers use our materials to best advantage."

Few of the fabricators (90 per cent are family or closely held organizations) can afford large research and development programs. But the industry is stepping up research, development, and educational pro-

grams through the AISC to win back lost markets and develop new ones.

Examples: The institute is putting more emphasis on public relations. It's working on new design principles, such as plastic design, and conducting lectures on the technique for architects and engineers.

• **High Labor Costs**—In this area, the fabricators face the plight of many industries. "Labor contracts in the steel industry should have no bearing on fabricators," stresses Mr. Straub of Fort Pitt Bridge. "Yet we're expected to match their rates. Our fringe benefits cost us 83 cents per hour per man last year."

R. N. Habans, executive vice president, Orleans Materials & Equipment Co. Inc., New Orleans, complains: "The toughest competition comes from small, Johnny-come-lately fabricators, particularly in Mississippi where labor costs $1.60 per hour compared with $2.20 per hour in our area."

• **Production Efficiency**—"We were faced with the decision of improving our productivity or going out of business," relates J. F. Mulach Jr., president, Mulfab Corp. His firm attacked the problem (see exhibit) by designing and building equipment to cut down handling costs—the chief headache of the industry. In addition, the development provided an opportunity for diversification—Mulfab now produces and markets the equipment.

• **Material Costs** — Several of the fabricators place part of the blame of lost markets upon the steelmakers and their pricing practices. Duane T. Molthop, president, Vierling Steel Works, Chicago, states: "Domestic mills should take a long look at the price structure of their products. Prices must be competitive or we lose business to other materials, as is the case of steel vs. concrete and domestic vs. foreign steel."

Mr. Straub also suggests the mills should tighten up on the allowable tolerances of structurals. The time consumed when a job is held up while a beam has to be taken back to the shop and straightened can be expensive, he says.

Many fabricators would like to see the steel industry simplify its complex pricing system.

• **Bidding Practices** — "You can't legislate ethics," chorus the fabricators. "Yet disastrous competition remains our most serious problem, and it's of our own making," declares Mr. Straub.

The bid depository is one approach that's being tried with some success in some sections of the country. Fabricators and contractors join in such a plan. The depository is generally operated by a secretary and a manager. Fabricators submit sealed bids on jobs offered by contractors. Once submitted, a bid cannot be replaced, and the contractor cannot shop the bid. In practice, the fabricators are not obligated to bid on all jobs; the contractor is not obligated to take the lowest bid if he feels he does not want to work with a particular fabricator.

"The practice has cut down the shopping and reverse auctioning," comments one fabricator. "It probably hasn't affected prices yet, but at least it does tend to develop greater confidence among competing fabricators."

Price cutting doesn't have a solution. But most of the steel fabricators feel much the same as R. J. Ryan, president, Nooter Corp., St. Louis: "You get to know who the chislers are, and when they want something special or want rapid delivery during good business periods, you put them at the end of the list."

And business is getting better.

Have you entered the

Usership Contest?

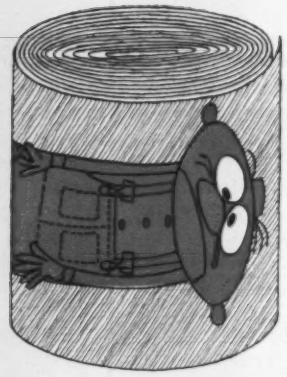
See the Servicenter, Pages 5 and 6.

How Mulfab Beat The Price Squeeze

"WITH MATERIAL COSTS fixed, overhead already cut to the bone, and labor rates controlled by union contracts, increasing production with fewer men seemed like the only solution," relates J. F. Mulach Jr., president, Mulfab Corp., McKees Rocks, Pa.

"Edwin L. Mead, our general manager, and his engineers tackled the problem. Result: A conveyorized production line which cut labor costs 50 per cent and boosted production at the same time (see STEEL, p. 70, Jan. 11).

"Our bookings and shipments are about three times those of 1959. We're operating at 84 per cent of capacity on a three shift, six day basis. We're operating at a profit at prices comparable to those of several years ago, in spite of increased material and labor costs."



Consider the plight of poor Chester Sloehold
Who slipped and fell in an ingot mold.
The furnace was tapped right into his lap
And he's now in a coil of cold rolled.

Safe Firms Tell How to Pare Perils

NOBODY can calculate the cost of a human life. Nobody really wants to. But some of the attendant costs can be figured. They're enormous.

The National Safety Council estimates that job-incurred accidents cost U. S. industry almost $4 billion last year. Some 230 million mandays were lost through work injuries. Of these, 40 million were lost by the injured workers. The rest piled up when other persons stopped to help, or to discuss the accident, or were laid off until damaged equipment was replaced.

High as this is, it's an improvement over 12 years ago, judging from the council's death rate index. It has decreased 24 per cent since 1948 for all industry. For manufacturing alone, the rate has dropped 25 per cent.

J. B. Holtzapple, safety director, Blaw-Knox Co., Pittsburgh, suggests that the indirect costs of an accident are four times as great as the direct costs. These costs are incurred when:

1. Everybody in the area stops work to find out what happened.
2. An inexperienced man has to be trained for the injured worker's job.
3. Supervisors have to spend extra time investigating an accident, later making sure the new man is doing the job correctly.
4. Machinery or equipment may have to be repaired or replaced.

Direct costs include hospitalization, doctor bills, and compensation. Many accidents may push up insurance and compensation rates.

STEEL queried several metalworking firms having reputations for safety. Their methods may give you some tips for bettering your company's safety program.

Ford Motor Co.—Its rate of 1¼ lost time injuries per million manhours worked is twice as good as it was in 1950 and made 1959 Ford's most accidentfree year on record. Company plants received 682 NSC awards, including 235 honor awards during this ten year period.

"It takes many things to make an accident—among them are usually an unsafe condition or an unsafe act," declares F. J. "Bud" Dery, safety director of Ford's industrial safety section. Like most safety conscious firms, Ford works at eliminating unsafe conditions through written standards for equipment safeguards, protective clothing, and specific job operations. All equipment and tools must be inspected and approved by plant safety engineers.

"Most of our accidents stem from workers knowing better, but just 'forgetting.' We don't know all of the psychological reasons behind a worker's behavior, but we do feel his attitude to a great degree is a reflection of his supervisor's attitude," says Mr. Dery.

Ford plants hold monthly safety training programs for supervisors. They in turn call at least two, 5-minute safety sessions with their workers each month.

They also make at least two daily contacts with each worker to talk safety.

Jones & Laughlin Steel Corp.'s Aliquippa (Pa.) Works has been cited as one of the safest steel plants in the country for its record of working 135 days or 10.5 million manhours without a disabling accident. In the previous five years, the plant averaged 20 lost time accidents for each 125 day working period.

Safety programs won't work unless top management is interested enough to make them work. Charles Beeghly, Jones & Laughlin president, took time from his busy day to make the J&L President's Award to Aliquippa. His attitude: "Management is responsible for efficient and profitable operations. Generally, the existence of accident causes implies a wasteful, inefficient operation. We can afford neither physical nor human hazards in our facilities. Safety is a production tool. My concept is not production *and* safety; it is production *with* safety."

Calumet Steel Castings Corp., Hammond, Ind., is one of seven member firms of the Steel Founders' Society of America that operated last year without a single lost

time injury. That is outstanding because the steel casting industry's accident frequency rate of 18 lost time accidents per million manhours is high.

Calumet supervisors are responsible for the safety of their men. Each time an employee is given first aid, a report on the accident is turned over to his departmental supervisor who must talk with the man and then determine a way to prevent recurrence.

"In-plant accidents have dropped 50 per cent since this program was started," declares Bob Weeks, personnel manager and safety director.

To make supervisors safety conscious, Calumet rotates management members of the four man plant safety committee every three months. Two union members serve two year terms. The committee tours the plant checking for hazards.

Blaw-Knox Co.'s Wheeling (W. Va.) Works is another of the seven "no lost time" firms that belong to the Steel Founders' Society. It has won a society achievement award every year since 1952 for keeping its accident frequency rate under 10. The last two years it won the top rating over 21 competing firms.

H. J. Mullarkey, safety director, says plant management delegates authority for the safety program to a 16 member committee. Unlike most safety groups, this one is composed entirely of workers—no management men allowed. Half are appointed by the company, half by the union. The group meets weekly to consider safety problems and make recommendations, which are sent to top management later in the week.

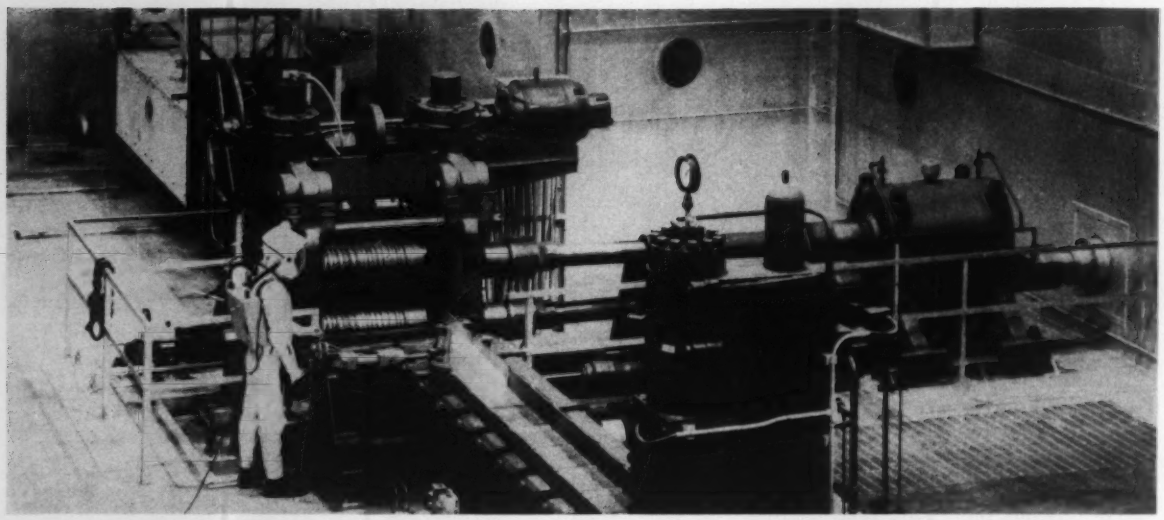
"Let your employees know what you do with their safety suggestions as soon as possible if you want to keep them making suggestions," asserts Mr. Mullarkey.

Adds one safety director: "Don't think you can turn the trick with one safety drive each year. Safety is a 24-hour-a-day proposition all year."

STEEL's safety checklist will help you evaluate your program. Your trade association and the National Safety Council will help you make it work.

Do You Pass the Safety Test?

	YES	NO
• Do you have a written policy on safety?	___	___
• Do you have a full time safety director at the management level?	___	___
• Does your safety program require each management member to participate in safety activities at least twice a year?	___	___
• Are safety activities co-ordinated with your union local?	___	___
• Are plant safety inspections made periodically and systematically?	___	___
• Are employee suggestions for improving safety solicited?	___	___
• Are employees quickly informed of action taken on their suggestions?	___	___
• Are periodic safety training sessions held for supervisors, foremen?	___	___
• Do you employ a checkback system to see that they are keeping their men safety conscious?	___	___
• Does your accident reporting system cover minor accidents so they can be evaluated and preventive measures taken?	___	___
• Do you have written standards for safety equipment on machines, tools, workers? Does equipment receive preproduction safety inspections?	___	___
• Do you have written safety rules for general shop practice, specific hazardous jobs? Does this include special training?	___	___
• Do you have an enforcement system covering violation of safety rules?	___	___
• Do you continuously promote your safety program?	___	___
• Do you have company safety awards? Does the company president make these awards or is the job passed on to someone down the line?	___	___
• Do you actively support local and national safety campaigns?	___	___



InFab technician watches molybdenum bar stock being hot worked at 4000° F on 16 x 36 in., two high rolling mill which is remote controlled

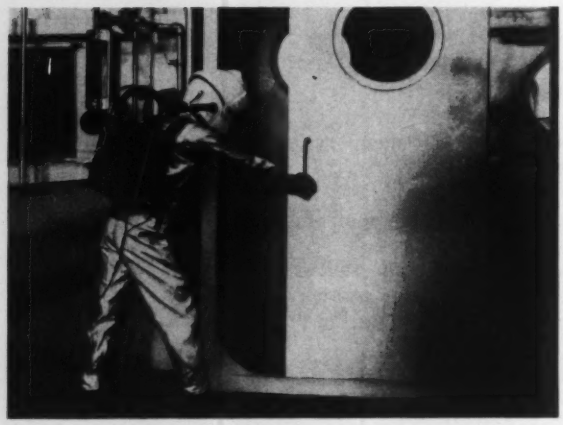
'InFab' Hot Works Refractory Metals

PRODUCTION of high integrity mill products of refractory metals and their alloys has started at the new InFab (Inert-Fabrication) facility of Universal-Cyclops Steel Corp., Bridgeville, Pa. Materials hot worked in an airless environment offer great promise for applications requiring high strength at ultra-high temperatures, says the firm.

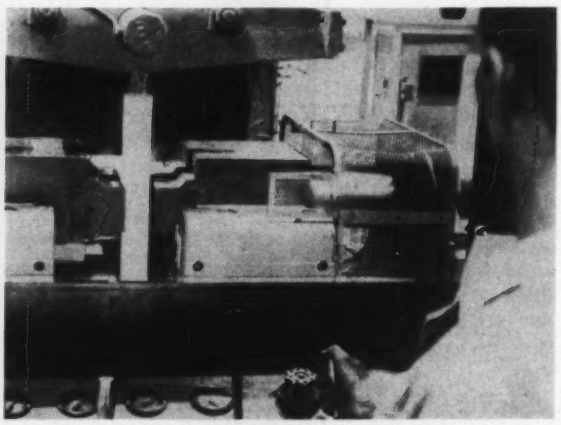
Molybdenum and other refractory metals should be worked at temperatures up to 4500° F to obtain full utilization of their properties. At such temperatures, however, the refractory metals are contaminated by elements in the air. Molybdenum oxidizes violently—giving off dense clouds of molybdenum oxide, destroying the material's surface and weakening its inherent strength and characteristics.

• **Airless**—To prevent contact with the atmosphere during processing at high temperatures, Universal-Cyclops' InFab facility is filled with inert argon. The argon is maintained at a pressure of ½ ounce per square inch above the atmospheric pressure outside the enclosure by means of a pressure balance system. The room atmosphere is continually changed and purified to maintain an argon purity level exceeding 99.99 per cent.

The InFab plant is a steel welded



InFab technician wearing specially designed 'space suit,' enters plant through personnel lock. Oxygen supply and cooling unit are in the pack on his back



Automatic impactor in action. The horizontal forge delivers an impact of 15,000 ft-lb. View is from remote control station outside enclosure

enclosure, 97 x 42 x 23 ft, in a building. The enclosure contains an impactor, rolling mill, furnaces, a 10-ton crane, and space for additional equipment. Forging and rolling of the refractory metals will be done at temperatures up to 4500° F. During operations, the temperature in the facility will range 80 to 100° F.

• **Automated**—The impactor, rolling mill, and furnaces are automatically controlled from consoles outside the facility. The consoles afford a complete view of the works through special glass which shields out harmful ultraviolet rays emitted from the white hot metal.

Experiments in hot machining and welding, which require personnel to be in the room, are planned for the near future. Technicians, when entering the room, are dressed in modified space suits which include two layers of insulating garments, a ventilation suit which permits complete circulation of air around the body, a gas tight layer, and an outer garment which shields against thermal and ultraviolet radiation. An air supply and cooling unit is carried on the technician's back. Communication and power supply lines are plugged into outlets inside the room. Entrance is gained through an air lock.

• **Outlook**—"Because InFab makes possible fabrication at true hot working temperatures without contamination," says Universal-Cyclops, "the number of processing steps can be drastically reduced. Fewer processing operations and anticipated higher product yield may enable InFab to produce superior metals at a cost comparable to those of exotic metals now commercially available."

Concludes the steelmaker: "Although it's a complex facility, InFab's advantages and possible economies virtually assure the production of many new and commercially significant alloys in the near future." At present, the only important market for such products is in defense work—nose cones, rocket and jet engines, and space vehicles.

InFab was conceived, designed, and constructed by the Refractomet Div. of Universal-Cyclops in technical co-operation with the Department of the Navy, Bureau of Naval Weapons.

Gearmakers' Bookings Run 10% Ahead of '59's

JAMES F. MURRAY
New AGMA president

GEARMAKERS anticipate a continuation of moderately high business through the remainder of 1960. Bookings for the first half are about 10 per cent higher than they were in the first six months of 1959, and manufacturers see no sharp change during the second half.

That's the consensus of members of the American Gear Manufacturers Association attending the group's forty-fourth annual meeting at the Homestead Hotel, Hot Springs, Va., last week.

"We are bottoming out at a high level," is the way one manufacturer puts it.

• **Markets**—Strength in the gear business is coming from a broad list of customers: Textiles, chemicals, general industrial, and general metalworking machinery manufacturers. Missiles and aircraft business is generally good, although gearmakers supplying the market think it should be much better.

Automotive business is below earlier expectations. Orders from the basic steel industry are disappointing. Shipbuilding continues slow.

• **Where Imports Hurt**—Direct imports are not yet considered a large problem, although gearmakers are keenly cognizant that they are losing substantially through increased imports and lowered exports in automobiles, machine tools, steel products, electrical generating equipment, and other products.

The Canadian market, which once accounted for 10 per cent of U. S. gearmakers' output, has largely been lost to England, and little hope of recovering it is seen.

James F. Murray, president of Winsmith Inc., Springville, N. Y., is the new presdent of the AGMA. Other officers: Charles F. Bannan, vice president, Western Gear Corp., Lynwood, Calif., is vice president of the Products Division; Folke Richardz, consulting specialist for gearing products, Westinghouse Electric Corp., Buffalo, N. Y., is vice president of Technical Division; J. H. Harper Jackson, sales manager of Jackson Gear Co., Pittsburgh, is treasurer.

Texas Could Get Bigger

Lack of water is the chief limiting factor to the economic growth of much of Texas, H. R. Drew, director of research, Texas Electric Service Co., Ft. Worth, told the American Society of Mechanical Engineers last week. His solution: Electrodialysis, a method which could turn the area's salty water into drinkable water for 30 to 50 cents per 1000 gallons.

How it works: Place permeable membranes in water between electrodes. Run current though the electrodes and the salt particles will move to one of them.

Electronic Controls on Highways... NLRB Clamps Down On Violence... Census Bureau Updates Housing Figures

● **MORE HIGHWAY RESEARCH REQUESTED**—National Academy of Sciences has come out for a $34 million, highway research program covering four or five years. Of special interest to metalworking are the requests for more work on such things as electronic devices to control vehicles. At least $3 million in public and private funds would be needed for that research.

● **BIG PUSH ON GRAPHITE RESEARCH**—The Air Force has given National Carbon Co., a division of Union Carbide Corp., New York, a $12 million contract for a graphite research and development program. Term: Three years. The material is regarded by many authorities as the best answer to space age heating problems in rocket nozzles, nose cones, and leading edges.

One of the goals: Quantity production methods. Union Carbide will build a laboratory at Lawrenceburg, Tenn. The program could lead to the production of pieces of top grade graphite which are 3 ft in diameter and 6 ft long.

● **NEW JOB FOR A BLIMP?**—Pentagon experts are busy figuring how they might transport the eight-story high rocket boosters of the future from the factory to the launch site. One suggestion receiving much attention: Modern, nonrigid airships. Transportation by road is impossible because the new boosters will be too wide for tunnels and bridges. Lighter-than-air craft don't need as much landing space as transport airplanes, so no one is considering building a plane big enough to haul the 40 ton rockets. A 5 million cu ft, nonrigid airship is feasible, says Goodyear Aircraft Corp., Akron. That's 40 per cent bigger than current types.

● **IMPORT-EXPORT DISCUSSION**—The Commerce Department is getting varied responses to its queries on the foreign trade problems of industrial equipment makers. Industrial fastener makers say their labor and material costs restrict their efforts to expand overseas sales, while the import problem is building up. The $1 billion industry sells about $20 million worth of its products abroad annually. About 60 per cent of its exports are to Canada. Members of the industrial power truck industry asked Commerce to recommend that U. S. government agencies cut down their purchases of foreign made power trucks. Railway equipment builders noted a need for legislation which would assure U. S. manufacturers a larger share of the purchases made by foreign countries with U. S. funds under the foreign aid program.

● **NLRB MEMO ON VIOLENCE**—General Counsel Stuart Rothman of the National Labor Relations Board has reminded all his field offices that "the policy of the National Labor Relations Act is to provide peaceful and orderly procedures for the resolution of industrial disputes." In the future, field offices will give careful consideration to withholding the benefits of the act from those unions which tolerate "flagrant or aggravated acts of force and violence." A further step would be for the board to seek an injunction against such conduct.

● **JOHNSON BANDWAGON STARTS** — Party leadership is taking steps to reduce the chances of Sen. John F. Kennedy (D., Mass.) winning the Democratic Presidential nomination on the first ballot. Sen. Lyndon Johnson's (D., Tex.) candidacy is now out in the open, for example. House Speaker Sam Rayburn (D., Tex.) is leading the drive to consolidate the anti-Kennedy forces. Such party stalwarts as Oscar Chapman (former secretary of interior under President Truman), India Edwards (former vice-chairman of Democratic National Committee), John P. McGrath of New York, and Edwin L. Weisl of New York are leading the "Citizens for Johnson" group. Labor is getting into the act through William C. Doherty, an AFL-CIO vice president.

● **PRESSURES FOR B-70**—Washington sources are citing the U-2 incident as reason enough for a second look at the B-70, the 2000 mph bomber cut back to two prototypes last year by the Eisenhower administration. About $420 million has been spent on development. The first bomber was scheduled to be produced in 1962. A return to the original 62 plane program would bring the cost of the project to almost $3.5 billion.

The Air Force has $50 million on hand to spend and has asked for $75 million in the fiscal 1961 budget. It would take at least $360 million in the new budget to restart the original project. The Senate is expected to consider seriously the Air Force's wishes.

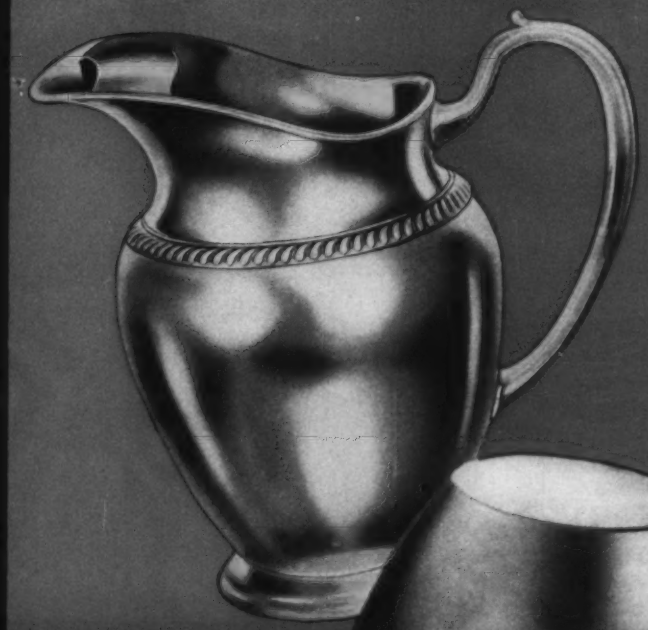
● **MORE ACCURATE HOUSING FIGURES** — The Census Bureau has revised its monthly estimate of housing starts (one of our most important economic barometers). The new figures show 1.5 million starts in 1959. The old figure was 1.4 million starts. The difference, says the Bureau, is mostly caused by more complete coverage of the field, including nonfarm housing starts.

Figures for 1960 now run: January, 85,500 starts; February, 89,500; March, 92,500 (preliminary for April, 117,700).

Another construction note: The Bureau of Public Roads states that over half of the 41,000 mile federal road program is completed or underway. One-fifth of the system is open to traffic.

Cincinnati Hydroform

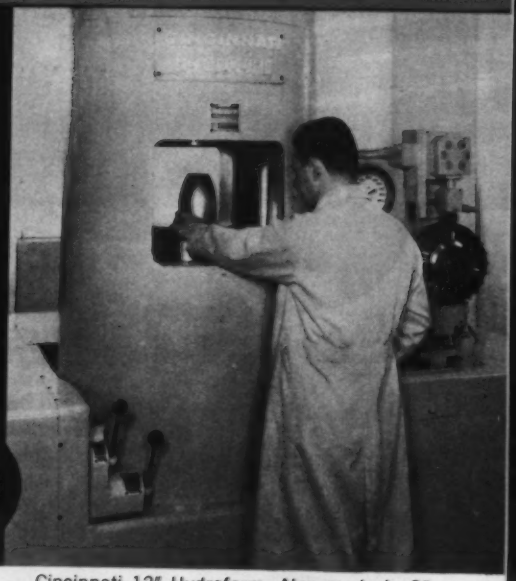
makes savings galore for Oneida Ltd.



After changing from conventional deep drawing to Hydroforming to produce the water pitcher body shown below, Oneida Ltd., Silversmiths, made the following cost comparison:

	CONVENTIONAL	HYDROFORM
Tooling costs	$3280.00	$400.00
Set-up costs	5 set-ups: $9.55	1 set-up: $1.65
Operations	3 draws	1 draw
	1 drop form	
	1 re-draw	
	1 spin	
	4 washes	
	2 anneal and pickle	
Base direct labor cost per 100 pieces	$11.49	$3.29

Water pitcher body produced by Oneida Ltd. on a Cincinnati 12" Hydroform in one draw. The part was drawn from a 12" dia. blank of .032" coil copper to a depth of 6 13/16". Max. ID is 4 7/8".



Cincinnati 12" Hydroform. Also made in 8", 19", 23", 26" and 32" sizes.

These figures speak for themselves. In addition, as Hydroforming produces the part with an unmarred surface finish, and with less thin-out than is possible by conventional methods, additional savings were made in buffing and finishing costs.

If you do deep drawing, or can convert a portion of your component part production to deep drawn shapes, you can receive the same benefits from Hydroforming now enjoyed by Oneida Ltd. Let a Meta-Dynamics Division field engineer give you details.

Hydroform

META-DYNAMICS DIVISION

Machines for Metal Forming and Heat Treating

THE CINCINNATI MILLING MACHINE CO.

Cincinnati 9, Ohio, U.S.A.

CINCINNATI

You Can
SEE
The Difference

You Can
WORK
The Difference

You Can
HAVE
The Difference
AT NO EXTRA
COST

Why Cleaner, Brighter LUSTERIZED® Bars Handle Easier and Work Better

If you haven't made a comparison run against ordinary cold finished steel bars with clear, bright Bliss & Laughlin Lusterized Finish bars, you will be impressed with the difference.

Lusterized bars start out cleaner, are less messy to handle, remain clean and bright during storage and production. The absence of processing grit, oil and lime keeps chucking mechanisms on automatics free from clogging and production flowing steadily at a profitable pace. The bright, clean surface often requires no finishing operation, reduces the need for elaborate pre-plating preparation.

Lusterized Finish is a Bliss & Laughlin exclusive. It is another result of a constant research program over nearly 70 years to produce cold finished steel bars that will improve your production and profits. Ask for a new folder detailing the production advantages of specifying Bliss & Laughlin Lusterized bars.

LUSTERIZED FINISH is the STANDARD FINISH at Bliss & Laughlin

Specialists in Finish, Accuracy, Straightness, Strength and Machinability

BLISS & LAUGHLIN

GENERAL OFFICES: Harvey, Ill. • MILLS: Harvey, Detroit, Buffalo, Los Angeles, Seattle, Mansfield, Mass.

Leading Independent Producer of Cold Finished Steel Bars

Japan's Boom Aids U. S. Exports

ALTHOUGH JAPAN is creating stiff competition for many American metalworkers, the nation's great industrial growth and rising standard of living are opening new markets for other metalworkers and related industries.

The land of the rising sun is already the second best customer for U. S. exports (Canada is first). American goods account for one-third of all Japanese imports. And all discriminatory trade controls on American products will be gone by the end of the year.

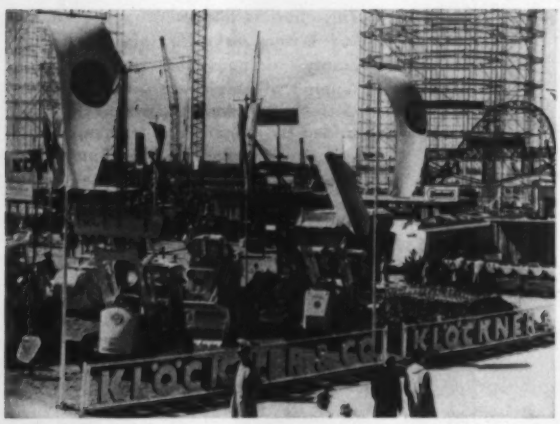
Japan is buying about $200 million worth of machinery and capital goods annually from the U. S. and by 1970 the figure will near $550 million, predicts the U. S.-Japan Trade Council. "Although Japan offers an excellent market for high quality U. S. tools, we must do a better selling job and provide better service," observes Jack Kleinoder, secretary-treasurer, Volkert Stampings Inc., Queens Village, N. Y. (He's a U. S. trade mission specialist on machine tools and production equipment.) Purchases of American management and technical knowhow and other services are expected to rise from the present level of $275 million annually to $520 million a year by 1970.

Crude steel production reached 16.6 million tons last year to push Japan into fifth place among the world's steelmaking powers. Hayato Ikeda, minister of international trade and industry, says the figure will be 36 million tons within 15 years. But the nation is not blessed with an abundance of raw materials. The Japanese Iron & Steel Administration foresees coking coal imports jumping from the 1959 level of 5 million tons to 12 million tons by 1965. Ore imports are expected to rise from 12 million tons to 20 million tons in the same period. Scrap imports, however, are predicted to fall from 4.5 million tons to 2.8 million tons a year.

Hannover Site of World Industry Fair

Over 4800 exhibitors hawked their wares at Germany's Hannover Industrial Fair, Apr. 24-May 3. Ninety-one American firms were among the group which had representatives from many industries—from steel to office supplies.

Dr. Herbert Gross, STEEL's correspondent in Germany, noted impressive improvements in materials and cost reduction through better testing, measuring, material handling, and increased automation. He said many firms offered consulting services to develop tailored machines and equipment for prospective buyers.

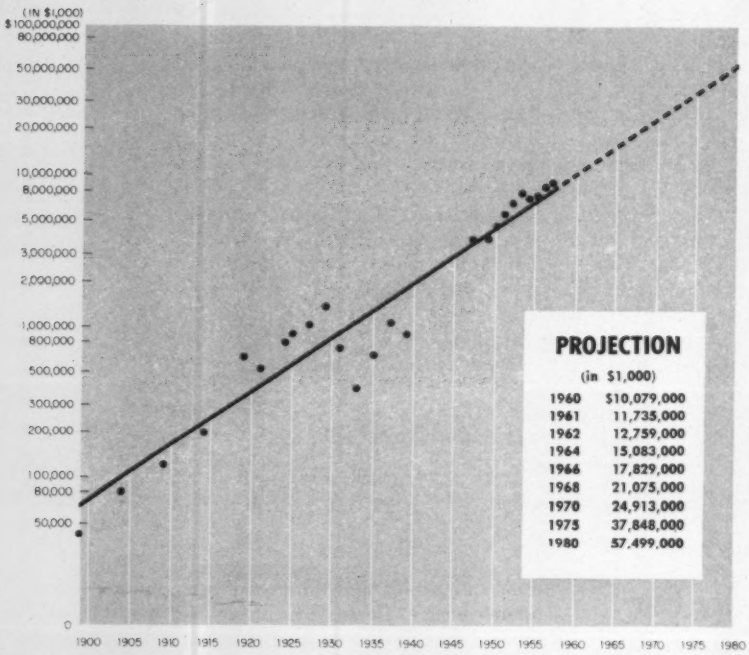


Of particular interest was a turbine generator set equipped with a free piston gasifier for operating on liquid fuel. Being produced by Demag's Motorfabrik Darmstadt GmbH, the unit is said to combine the efficient fuel heat conversion of the piston engine with the uncomplicated power transmission of the turbine. German made ultrasonic welding equipment also attracted much attention.

World Steel Output Sets Record

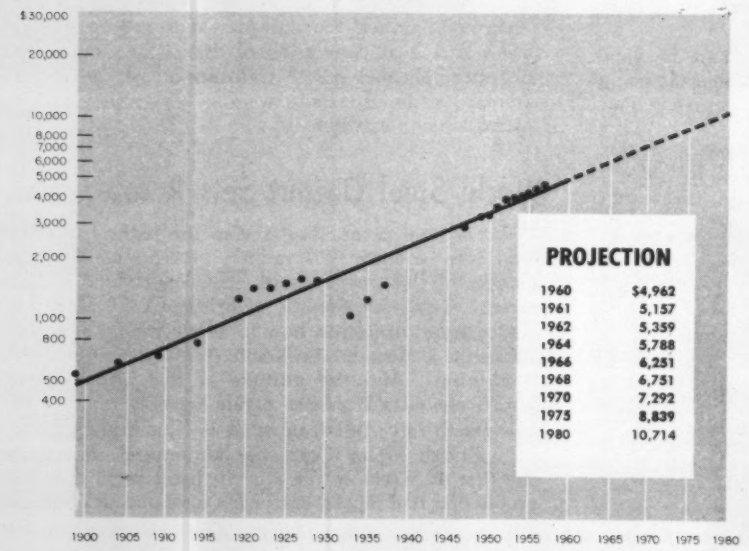
World steel production rose to the highest quarterly total ever reached, 97.8 million tons in the first three months of this year, reports the Department of Commerce . . . *Steel Review*, a British publication, concluded in an article on how to attack the U. S. market: "There is a demand in North America for just about everything. And the attitude of the American consumer, committed neither psychologically nor by trade barriers to buy American only, is 'Come and get it!' " . . . British Motor Corp. has announced that during the first 40 weeks of the current fiscal year, its vehicle production had topped last year's total output of 486,000 units.

How Electrical Machinery Industry Will Grow Over Next Two Decades



Value Added by Manufacture to Jump to $57.5 Billion by 1980

This chart shows the value added for each census year from 1899 through 1957. The dots are the actual figures for each survey year. The line is the trend. Dots are missing for World War II years in all the charts for electrical machinery because surveys were discontinued then for security reasons. Dollar figures in this and other charts are unadjusted, and the projections include estimates for future inflation.

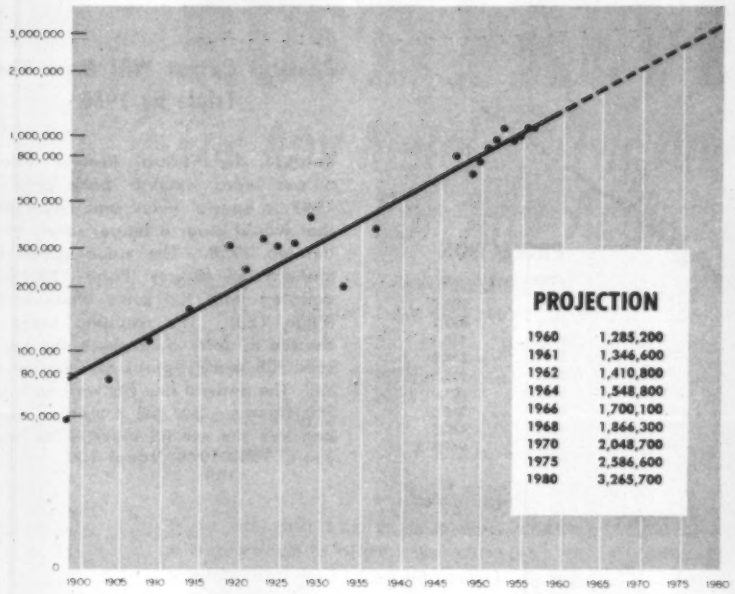


All Employees' Average Annual Earnings Will Double

This chart is derived from corresponding census data for total wage and salary compensation and the total number of employees. Economic productivity, or the yearly ratio of value added by manufacture (above) to total earnings in electrical machinery, has been nearly constant at the $1.811 average for 1947 through 1957. This illustrates the Rucker Share of Production Principle, and it shows that the employee's share of production for electrical machinery, taken as a whole, is 55.2 per cent of the values created and that the company's share averages 44.8 per cent.

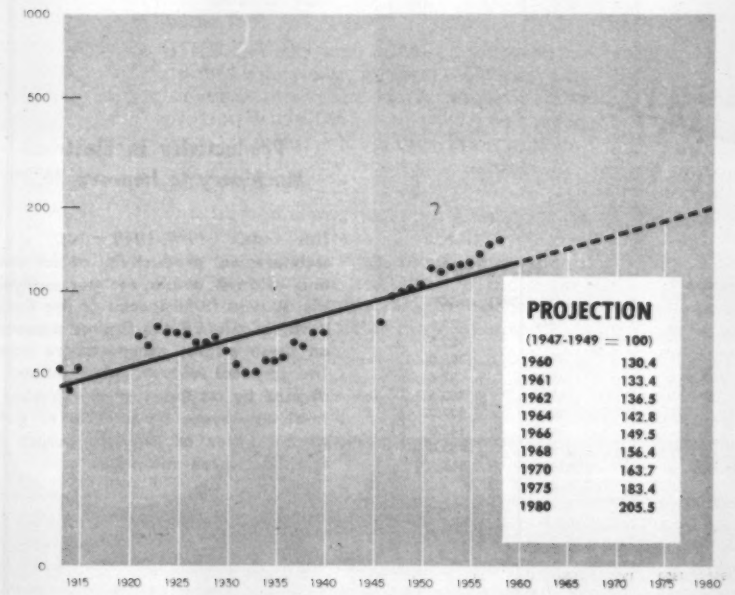
PROJECT 1980

Value added by manufacture will be almost six times greater in 1980 than it is this year. Employment will increase by nearly 2 million. Physical output will be three and a half times higher. Those are some of the probabilities projected for Standard Industrial Classification Group 36 by Eddy-Rucker-Nickels Co., management consulting firm in Cambridge, Mass. This is the first of six metalworking growth studies prepared for STEEL.



Employment to Reach 3,265,700 Within 20 Years

This charts both hourly and salaried employees for each census year from 1899 through 1957. The formula for the trend line has been developed from 58 years of background as a base for the projections. Because extensive data are available for electrical machinery, it can be assumed that the long term trend will continue in all projections. Experience shows that established growth trends change slowly, if at all. But actual conditions in any future year may fluctuate above or below the trend. So all six of these projections represent probabilities, not precise predictions.



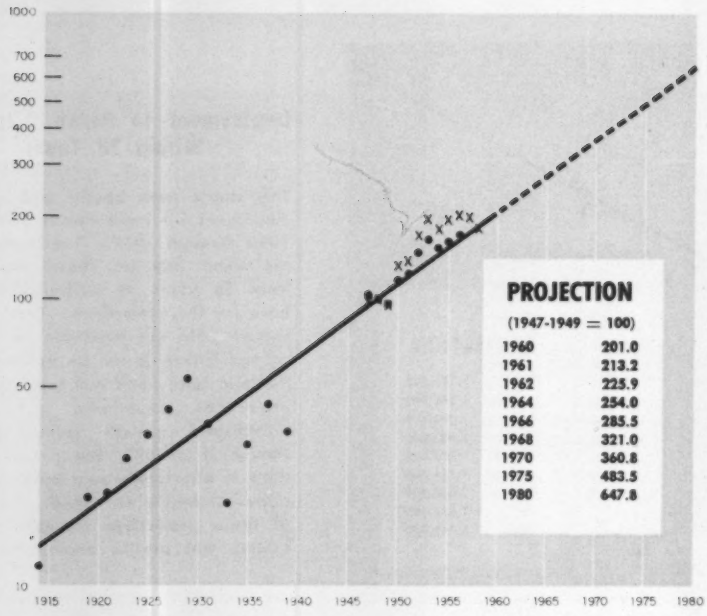
Electrical Machinery Prices Will Rise 57.6%

This is for wholesale product prices. Index figures for 1913 through 1938 are used, corresponding to the classification, metal and metal products, of which electrical machinery is a later subclass. The Bureau of Labor Statistics price index for SIC 36 was used for 1939 through 1958. The years of World War I and II are omitted because lack of price controls made quotations unusually high in the first war and imposition of ceilings made them unusually low in the second. The resulting trend from 1913 through 1958 corresponds closely to experience since 1946. The base years, 1947-1949, equal 100.

(Please turn to Page 124)

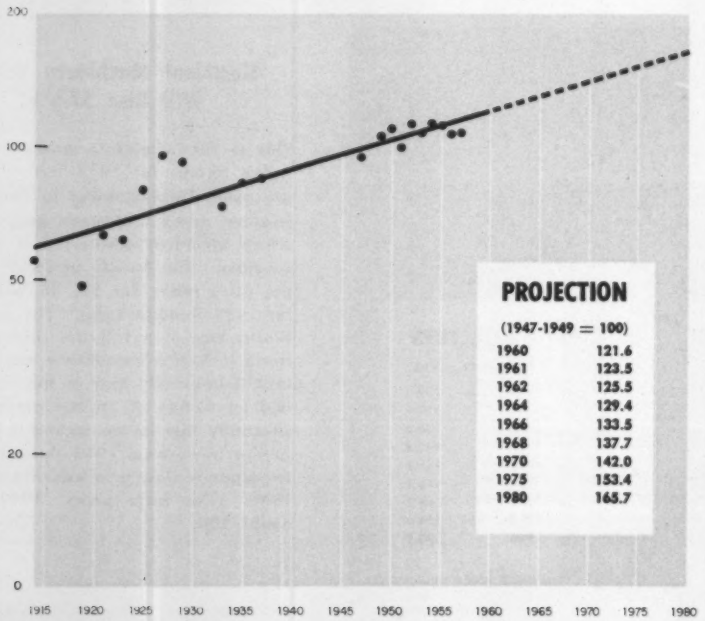
PROJECT 1980

• An extra copy of this article is available. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio. By using material like this, you may win $1000. For details, see Pages 5 and 6. On June 27, STEEL's "Project 1980" will be a study of the instrument industry.



Physical Output Will More Than Triple by 1980

Because the Federal Reserve Board output index extends back only to 1947, a special index was developed that would cover a longer span, 1914 through 1958. The value added by manufacture figures (Page 122) was deflated with the price index series (Page 123). The resulting index is charted as dots. As a check, the available FRB index figures are charted as Xs. The derived line fits well with the FRB figures. But the projection numbers use the special index. The base years, 1947-1949, equal 100.



Productivity in Electrical Machinery to Improve 36.3%

This index (1947-1949 = 100) shows technological productivity of all wage and salaried employees per manyear. It's derived from Bureau of the Census data, as are all the figures presented on these pages, except where noted. The physical output index (above) is divided by an index of the number of total employees (Page 123) to get a special index of physical output per total employee manyear.

END RUST PROBLEMS FOR GOOD

USE STEELGARD

Reg. U.S. Pat. Off.

RUST PREVENTIVES

For Any Metal . . . For Any Length of Time For Any Application . . .

STEELGARD is a *whole family* of rust preventives built to protect your metals in almost any situation where corrosion may be encountered. Each STEELGARD is different because problems and plant requirements are different.

You may want:

- **protection for several hours or many years**
- **a dry, visible or invisible coating**
- **an oily but easily removable coating**
- **application to oily or wet surfaces**
- **protection for indoor or outdoor storage and shipping**

Whatever the situation, our technical men can recommend a STEELGARD that will protect your metal and your pocketbook, too.

STEELGARDS are used as received or diluted with water, mineral oil, or solvents for extra thrift. The water phase method protects while the metal is wet, drying or dry. It is water soluble only upon application and the dry coating prevents oxidation and rust.

This tremendously versatile family of rust preventives has racked up many remarkable problem-solving and money-saving case histories, as indicated to the right, and we would appreciate the opportunity to discuss your corrosion problems.

Write, wire or call and let us show you how STEELGARD can save you money over your present method and give you better rust protection.

SOME **STEELGARD** CASE HISTORIES

Light Gauge Stampings Protected, Painted Over Without Removal of STEELGARD

Parts were tested with other rustproofers, stored for days to weeks prior to painting. Only STEELGARD dried completely enough to allow painting without removal or affecting the paint.

Prevents White Rust on Galvanized Pipe

Galvanized pipe shipped to seaboard ports corroded fast. STEELGARD now keeps it bright and rust-free, leaves dry invisible film.

Metal Mold Protection

Steel or cast iron molds used in the glass, rubber or plastics industry were protected with oils and vaselines. Messy handling, dirt attraction and difficult degreasing were done away with by changing to STEELGARD which cost less and protected longer.

Rustproofing Hot Rolled Steel Nuts

Former oil caused skin rash and rust developed in a matter of days. Changed to STEELGARD, one or two minutes immersion. Entire shipment of nuts and bolts stays perfectly rust-free.

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Manufacturers of
HAMIKLEER, ACTIVOL, HAMICOTE,
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HARRY MILLER CORP.

Original Products and Processes Since 1936

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DAvenport 4-4000 *Service Representatives in Principal Cities*

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PRECISION MATES!

Centerless grinding is the highest in the art of metal finishing. Unless the work wheel and the regulating wheel have been made for each other, a *needless* handicap occurs. U.S. Rubber centerless wheels are precision-mated. The production of perfect mates for centerless grinding is a U.S. Rubber specialty.

"U.S." Vulcanite was the first rubber-bonded wheel made for industrial America. 100 years of production and research back up our present *precision mates*. The hundreds of plants that use "U.S." Vulcanite *precision-mated* wheels prove the point that to do otherwise imposes a needless handicap.

The "U.S." Grinding Wheel sales engineer will save dollars for you in your grinding operations. We will welcome a call from you at U.S. Rubber, Grinding Wheel Dept., 10 Eagle Street, Providence, R. I., or the address below.

Mechanical Goods Division

United States Rubber

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

Rockefeller Center, New York 20, N.Y. In Canada: Dominion Rubber Company, Ltd.

Guessing Game on Detroit's '61 Models Gets Hotter

Public introductions of 1961 cars are scheduled between mid-September and Oct. 15. Dealer and press previews start in mid-August. Detroit is bulging with a rash of reports on last minute changes and adjustments on the new models and other advance programs

What's Up Front?

TEMPEST, Pontiac's small car, had been scheduled for an in-line, four cylinder engine cast from gray iron. Now the word is that the gray iron job has been temporarily held up and the car will initially appear with the V-8 aluminum powerplant that will be standard in Buick's Special and Oldsmobile's F-85. The four cylinder job is expected to be ready by November.

More cast aluminum means more business under molten metal contracts. Aluminum Co. of America says at least 120 million lb of aluminum castings will be needed for compact car engines next year. That's double 1960 consumption. General Motors will be the biggest user. Sherrod E. Skinner, one of GM's executive vice presidents, reports his company's aluminum purchases amounted to 1.16 per cent of the total aluminum production in the U. S. and Canada last year. He adds that some 42 million lb were turned into castings. Despite Congressional accusations, Mr. Skinner insists that only a tiny percentage of the metal purchased under molten metal contracts is sold outside the corporation: In the first three months of this year, such sales totaled $2040.

In an effort to reduce casting costs, GM will be using a different coremaking process in its foundries next year. Pontiac has pioneered the development. GM foundry groups are adopting it. Called a "hot box" in company circles, the process employs a fast curing, coremaking machine that will operate in conjunction with present molding machine lines. It eliminates core ovens, improves dimensional accuracy of the cores.

More confusion has been created about the Ford small car tagged at various times Segment III, Hummingbird, and Cardinal. Most sources agree that the car has about a 96 in. wheelbase, is in the 1600 to 1700 lb category, and will sport a front mounted, gray iron engine. But whether the engine will be mounted transversely and whether the car will have front wheel drive are still unanswered questions. Another question: When will it appear?

When these rumors are unscrambled it looks like there really are two small Ford cars, one for the overseas trade, and one for the domestic market. Most of the power train tooling for both vehicles is being done in Europe which may be how the stories got scrambled. The foreign model (one report says its a completely revamped Anglia) is supposed to have a slide-out engine mounted sideways in front. The domestic job will have a narrow angle V-4 engine cast in gray iron and mounted conventionally. Both will have front wheel drive. It still looks like a 1962 model year debut for the U. S. version.

Another front end tidbit—Chrysler's Imperial will use four, zinc diecast, headlamp housings on '61 models. They weigh about 4 lb each and protrude several inches beyond the grille line on prototypes.

Transmission Trends

Pontiac's whipshaft project apparently has been speeded (see STEEL, Mar. 14, p. 63). The division now hopes to have this type of propeller shaft ready for the Tempest. It may come out at the same time the four cylinder engine is introduced. Tempest, incidentally, definitely will have independent four wheel suspension and a transaxle arrangement.

Other updated rumors have it that a transaxle has been released from Saginaw Steering Gear Div.

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for 1962 Cadillacs. That report has cropped up from several sources, but Detroit Transmission Div. people still say "not so." One story is that there's an intradivisional battle shaping up between the two outfits for more of GM's power train business.

Chrysler Corp. also is developing a new automatic shift that's smaller than its regular Torque-Flite, but larger than the Valiant's transmission. This unit is supposed to go into production in the spring of 1962. Which cars will get it isn't known. It could be a replacement redesign.

And Ford and Mercury appear to be re-entering the rear transmission contest. Earlier this year, the company was working on two front wheel drive projects, one of which was aimed at the standard size cars. But when Ford finally picked front wheel drive for the smaller car, the other setup was shelved and informants claim an older transaxle program has been reopened.

Trim Treatment

Chevrolet is still strong on aluminum trim much to the chagrin of several stainless steel outfits that thought they were going to capture more of Chevy's 1961 trim business. Ternstead Div., GM trimmaker, reportedly isn't as sold as Chevrolet on aluminum. It will make Chevy trim parts on a "find out for yourself that we're right" basis. Despite some hopeful industry talk, GM wheel covers will not be switched to aluminum, but this business is being taken over from an old time supplier and will be split between Brown-Lipe-Chapin Div. and a different backup source.

Aluminum bumpers, still being touted by the aluminum companies, do not appear likely for 1961 except in limited test volume at Chrysler, and possibly at Pontiac. The GM division reportedly likes the Kaiser Aluminum stamped and chrome plated approach for Tempest. Chrysler has investigated the hot formed extrusion and anodized method developed by Reynolds Metals Co., but has no preferences over the stamping job.

Chrysler would like to try out 10-000 on next year's Valiants, but wants competitive vender bids before going ahead. A stainless clad bumper has been shown to Ford, but it carries at least a $2 per car cost penalty which makes it a doubtful proposition, say company purchasing people.

To meet this competition, other carmakers are upgrading plating standards to follow adaptations of the binickel processes. Cadillac will go to a triple layer coating next year. There also appears to be more of a shift to cold rolled steel for bumper stock. It's slightly more expensive, but requires less buffing after the copper strike.

Elsewhere on the corrosion front, Chrysler reportedly is having problems with the water soluble primer used in its body dip. That will be remedied, however, because the corporation must keep down warranty costs. It won't scrap that kind of capital investment before the equipment is amortized. A final note: Valiant definitely will bear the Plymouth brand for '61. There will be a single De Soto series; that line now is supposed to be phased out in 1962.

Do You Like Cars?

How about two weeks' free use of a Thunderbird or any of the 21 cars made by Ford Div.? For the how to and an entry blank, turn to the Servicenter, Page 5.

Body Terms Standardized

Automotive suppliers and designers sometimes confuse each other by using different names to refer to automotive parts that have specific functions. Result: The Society of Automotive Engineers has prepared a list of body terms which is being incorporated into its automotive drafting standards.

• Here are some of the terms that may affect you as a supplier:

Brace—A part used to maintain rigidity between members of a structure.

Bracket — A member projecting from a surface to sustain a load.

Gusset—A part used to distribute load concentrations on a structural joint.

Reinforcement — A part used to strengthen a structural member in a particular area.

Support—A member used to hold up or in position, transmitting the load to the structure.

• Here's another family of names the industry finds often is misapplied:

Bezel—A decorative rim or frame which encompasses a part in its setting.

Emblem—A decorative part which has symbolic meaning.

Escutcheon—A plate upon which a door handle or ornament is mounted.

Medallion—A decorative part having surface detail in low relief, usually set in another part, such as a bezel.

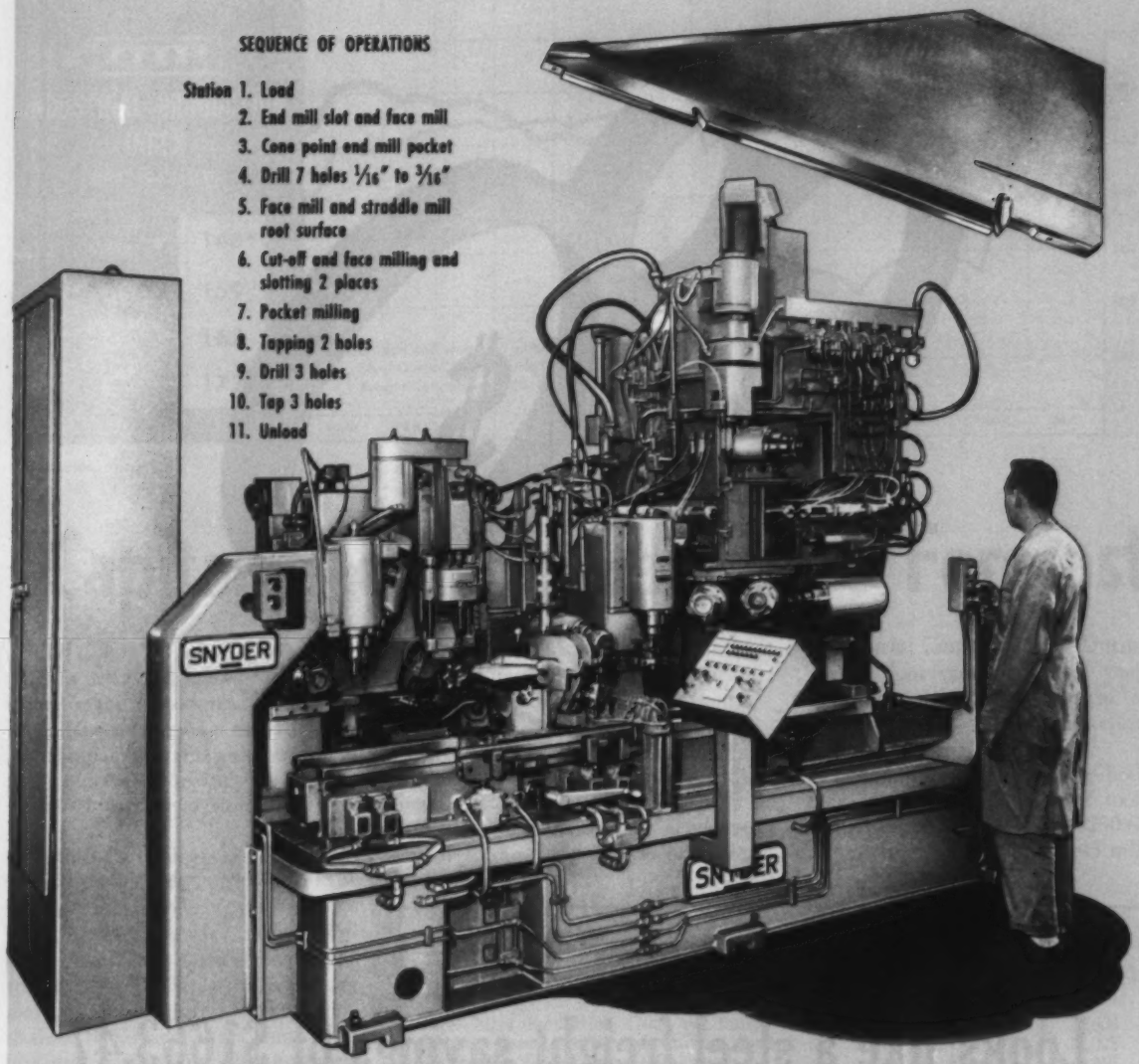
Ornament — A decorative part without symbolic meaning.

U. S. Auto Output

Passenger Only	1960	1959
January	688,731	545,756
February	659,323	478,518
March	654,242	576,080
April	582,909	578,846
May	611,226	546,817
5 Mo. Totals	3,196,431	2,726,017
June	.....	557,995
July	.....	555,410
August	.....	239,149
September	.....	258,151
October	.....	507,527
November	.....	254,527
December	.....	494,931
Total	.....	5,593,707

Week Ended	1960	1959
May 7	142,091	134,763
May 14	145,917	135,856
May 21	154,755	133,568
May 28	142,359	117,372
June 4	117,186†	125,186
June 11	145,000*	127,029

Source: *Ward's Automotive Reports*. †Preliminary. *Estimated by STEEL.


SEQUENCE OF OPERATIONS
Station 1. Load
2. End mill slot and face mill
3. Cone point end mill pocket
4. Drill 7 holes 1/16" to 3/16"
5. Face mill and straddle mill root surface
6. Cut-off and face milling and slotting 2 places
7. Pocket milling
8. Tapping 2 holes
9. Drill 3 holes
10. Tap 3 holes
11. Unload
SNYDER
SNYDER

COMPLEX MISSILE WING GETS 24 PRECISION OPERATIONS IN SPECIAL SNYDER PROGRAMMING TOOL

at Martin Company's Baltimore Division

Production rate, tolerances and part configuration dictated the fundamental design concept of this exceptionally compact tool which has 11 stations and performs 24 operations.

The cycle can be automatic, semi-automatic or manual. Controls for multiple cycle operations are provided by utilizing basic circuits triggered by a programming control device.

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(Formerly Snyder Tool & Engineering Company)

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Now . . . Look to Lukens For Steel Shape Savings

Looks like a steel freight savings of $1663.47

The owl-eyed steel shape pictured above is a 3½" gage shackle plate. It weighs 483 lbs. and was flame cut to special tolerances in one of Lukens' fabricating shops. A customer ordering 50 of these from—say—600 miles away would pay a freight charge of only $493.89 on the pieces.

However, if the same customer decided to flame cut the parts himself, 106,800 lbs. of 3½" gage steel plate stock would be required. Cost of shipment . . . $2157.36. Extra cost to the customer on freight alone . . . $1663.47. *Plus* . . . the expense of his equipment investment . . . the tie-up of his capital in plate stock . . . the cost of handling 75% scrap . . . the problem of shop spoilage.

Moral: Don't pay freight on scrap. Contact Lukens for Steel Plate Shapes Service . . . flame cutting, shearing, blanking, bending, pressing, welding—of carbon and alloy plate produced on our own rolling mills. Call or write Fabrication Building, Lukens Steel Company, Coatesville, Pennsylvania. Address Dept. B-60.

LUKENS STEEL COMPANY
B-60 Fabrication Building
Coatesville, Pa.

Please send me your free booklet on Steel Plates Shapes.

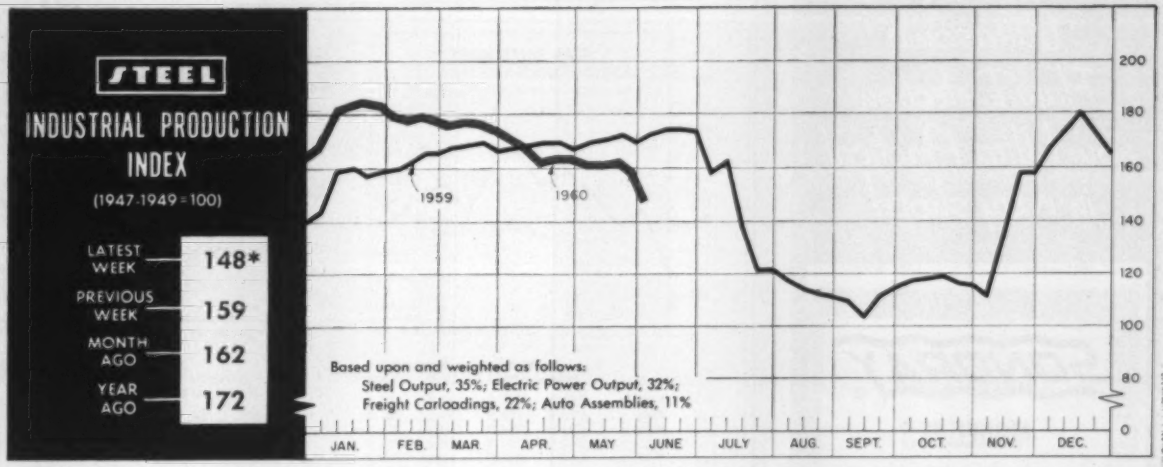
Name_____

Company_____ Title_____

Address_____

City_____ Zone____ State_____

LUKENS



*Week ended June 4.

Capital Spending Gains Are Forecast

SPENDING for plant and equipment is still being looked to as one of the strongest factors that could keep the 1960 economy on a record-breaking campaign. It may do so, but it will take a whopping big second half to overcome a slow start.

• **Bullish Outlook** — Evidence that spending plans are improving in the face of less-than-expected business gains is offered by the Federal Reserve Bank of Philadelphia. This spring, it rechecked the spending plans of manufacturers in the industrialized Delaware and Lehigh Valleys and found that most businessmen have boosted their fall estimates of 1960 spending. In the Philadelphia area, they have upped their sights by 7.6 per cent. In the Trenton, N. J., area, the gain is 32.1 per cent; in Wilmington, Del., it's 38.2 per cent; and in the Lehigh Valley, it's 53 per cent.

Manufacturers in Philadelphia believe 1960's capital expenditures will top the record (set in 1957) by 4 per cent. Producers of durables anticipate a rise of 26 per cent over last year, while producers of nondurables see only a 6 per cent improvement. The gains in the other three areas are equally impressive.

• **Position Today**—If the Philadelphia area is indicative of the national outlook—and the bank feels it is—you can expect some rather spectacular gains over the rest of the year. Reason: In many key industries, the figures for the first few months of this year fail to show any such gains. To date, comparisons with the 1957 pace (the record year for total spending for plant and equipment) leave much to be desired. For example:

• **Industrial Construction** — During the first four months of this year, work put in place was valued at $8.47 billion vs. $11.99 billion in the corresponding 1957 period.

• **Machine Tools**—Orders for both cutting and forming types of tools through April totaled only $230.65 million compared with $284.45 mil-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,775[1]	1,726	2,604
Electric Power Distributed (million kw-hr)	13,200[1]	13,572	13,023
Bituminous Coal Output (1000 tons)	8,415[1]	8,365	8,248
Crude Oil Production (daily avg—1000 bbl)	6,800[1]	6,815	7,032
Construction Volume (*ENR*—millions)	$648.0	$389.1	$317.1
Auto, Truck Output, U. S., Canada (*Ward's*)	149,014[1]	180,843	162,200
TRADE			
Freight Carloadings (1000 Cars)	590[1]	640	683
Intercity Truck Tonnage (changes from year ago)	−1.8%	−4.8%	+29.8%
Business Failures (Dun & Bradstreet)	299	313	264
Currency in Circulation (millions)[3]	$31,811	$31,684	$31,645
Dept. Store Sales (changes from year ago)[3]	+14%	−1%	+5%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$23,916	$25,068	$24,176
Federal Gross Debt (billions)	$289.2	$288.6	$286.4
Bond Volume, NYSE (millions)	$24.4	$26.2	$27.5
Stocks Sales, NYSE (thousands of shares)	14,591	15,976	14,786
Loans and Investments (billions)[4]	$102.7	$102 9	$94.6
U. S. Govt. Obligations Held (billions)[4]	$25.8	$25.8	$31.3
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[6]	231.5	231.2	222.2
All Commodities[7]	119.7[1]	119.7	119.4
Commodities Other than Farm & Foods[7]	128.4[1]	128.4	127.8

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1960, 2,844,308; 1959, 2,831,846. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

Ultrasonic Flaw Detection now Ultra-Practical in every shop!

THE NEW BRANSON

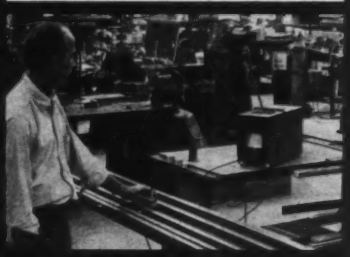
SONORAY®

MODEL 5

pulse-echo type instrument

combines the highest performance yet achieved with the smallest size, weight and price in the field. It is equally at home in contact and immersed work.

Every metalworking shop can now afford quick, accurate, inexpensive tests on internal structure of Bar Stock, Strip, Plate, Castings, Weldments. Brazed Assemblies, Machinery Shafts, etc.



SONORAY® Ultrasonic Flaw Detector testing aluminum bar stock; easily probes the full 12-foot length as well as through thickness.

SONORAY® Model 5 clearly resolves 3/64" FBH at 3/16" in contact at 2.25 mc/s — reveals 1/64" FBH full-scale at 2.25 and 5.0 mc/s — brings laboratory precision into the field with simplified controls, a weight of only 37 pounds and a price of . . . . . $2750.

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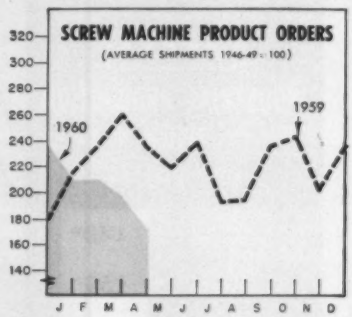
THE BUSINESS TREND

	Bookings 1960	Bookings 1959	Shipments 1960	Shipments 1959
Jan.	243.4	218.6	207.3	187.7
Feb.	278.6	199.9	230.2	201.5
Mar.	231.8	234.3	244.6	222.7
Apr.	249.2	255.6	234.8	231.8
May	....	241.0	....	223.9
June	....	274.2	....	239.7
July	....	262.8	....	199.8
Aug.	....	213.3	....	204.3
Sept.	....	213.9	....	216.1
Oct.	....	230.5	....	224.1
Nov.	....	208.7	....	224.2
Dec.	....	233.9	....	250.2
Avg	....	234.7	....	218.8

American Gear Mfrs. Assn.
Charts copyright, 1960, STEEL.



	New Orders 1960	New Orders 1959	Shipments 1960	Shipments 1959
Jan.	209	215	220	193
Feb.	207	236	219	193
Mar.	198	260	241	214
Apr.	172	234	204	219
May	...	219	...	201
June	...	239	...	218
July	...	192	...	194
Aug.	...	194	...	205
Sept.	...	236	...	217
Oct.	...	243	...	243
Nov.	...	201	...	208
Dec.	...	237	...	225
Avg	...	226	...	211

*Preliminary.
National Screw Machine Products Assn.

lion. For shipments, the figures were $218.2 million vs. $429.5 million.

• **Foundry Equipment**—New orders in the first quarter averaged 126 per cent of the 1947-49 base vs. 144 per cent in 1957's first period.

• **Freight Cars**—Through April, the railroads ordered 18,070 freight cars vs. 19,893 in the first four months of 1957. Deliveries were 19,430 compared with 35,377.

• **Material Handling Equipment**—Bookings in the first quarter averaged 125.8 per cent of the 1954 average compared with 135.5 per cent in the similar period of 1957.

• **Welding Equipment**—Shipments for resistance welding equipment from January through April totaled $10,099,000 compared with $11,503,000 in the first four months of '57. Comparison for orders: $12,089,000 against $12,260,000.

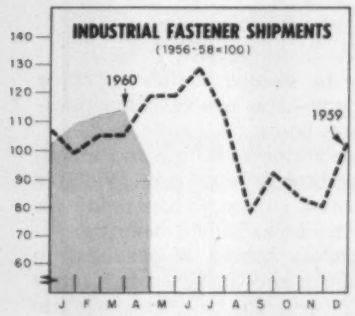
• **Furnaces** — Among the capital goods industries charted monthly by STEEL, the industrial furnace manufacturers are in the best position by far. They had a gain in the first four months. Comparison: $35,108,000 vs. $33,588,000 in the same '57 period.

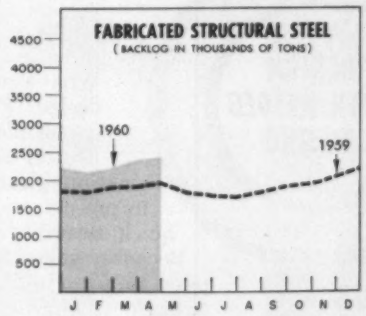
• **Groundwork Laid** — Obviously, much ground must be covered if the 1960 projections are to be realized. But the Philadelphia bank points out that much of the ground has already been covered. "The fact is that (total) manufacturers' new orders have been higher than they are now only once before—in the second quarter of 1959. Orders lead capital spending considerably . . . When new orders reach a high level, they tend to stay there, while capital expenditures respond by continuing upward until they too level off, not to turn down again until some time after new orders drop . . . (This lag) in capital spending . . . is occurring approximately as in earlier postwar years."

• **Outlooking 1961**—The bank also finds that capital spending plans for 1961 have undergone some changes since last fall, but here the news is not so good. While 58 per cent of the firms surveyed still look for no change next year, the rest anticipate a decline.

Sees Probable Uptrend

Prentice-Hall Inc., Englewood Cliffs, N. J., sees a probable reversal of the downtrend in new orders in the third and fourth quarters. "The switch will be due mainly to the





(Seasonally adjusted)

	1960	1959	1958*	1957*
Jan.	109	99	133	173
Feb.	112	105	117	177
Mar.	114	106	103	166
Apr.	95	119	102	157
May	...	119	111	168
June	...	129	120	162
July	...	112	133	184
Aug.	...	77	120	155
Sept.	...	92	141	159
Oct.	...	83	137	163
Nov.	...	80	134	147
Dec.	...	102	152	140
Avg	...	101	125	162

*1947-49=100.
Industrial Fasteners Institute.

	Shipments 1960	Shipments 1959	Backlogs 1960	Backlogs 1959
Jan.	209.0	224.3	2,116	1,794
Feb.	240.9	216.1	2,189	1,864
Mar.	277.0	260.5	2,364	1,873
Apr.	286.9	290.6	2,401	1,922
May	...	294.1	....	1,768
June	...	365.4	....	1,717
July	...	238.6	....	1,679
Aug.	...	220.4	....	1,772
Sept.	...	182.6	....	1,871
Oct.	...	195.3	....	1,891
Nov.	...	180.8	....	2,068
Dec.	...	235.7	....	2,195
Total	....	2,904.4		

American Institute of Steel Construction

normal need for more supplies after a long stretch of belt tightening. But it will also result from increasing political, economic, and perhaps military pressure in trouble spots in many areas of the globe. . ."

It points out four reasons why its outlook for 1960 is conservative:

1. Consumer spending for goods is low relative to income.

2. Plant and equipment spending is low in relation to corporate profits and cash flow.

3. Inventories are generally moderate "if not downright low."

4. Government spending is low relative to defense pressures and public service requirements.

"The longer the expected pickup in orders is delayed, the stronger the fall and winter rebound . . . needed to fulfill current expectations."

Index Takes Usual Holiday

STEEL's industrial production index followed considerable precedent when it plummeted 11 points during the Memorial Day week. In almost every year marked by a lack of strong upward pressures, the loss has been of similar proportions, but most of the ground is usually regained within the following week or two. So the trend line may be of special significance in the next two weeks as an indication of the underlying strength—or lack of it—in the economy.

The reading of 148 (1947-49=100) for the week ended June 4 was the lowest point for the trend line since the end of the steel strike last November. All four elements in the index contributed to the decline, with steel output and auto production accounting for most of it.

Some pickup was scheduled in steel operations during the week ended June 12, but industry officials warned that it was not to be interpreted as a reversal of the downtrend which has been going on almost continuously since the first of the year. In the auto industry, the postholiday gain is indicative of the bullish atmosphere at Detroit. While May sales showed only a 1.8 per cent gain over those of April, the year-to-year gain was a solid 7 per cent above the corresponding 1959 total. It was the best May since 1955.

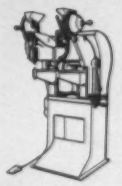
In the electric power segment of the index, the rebound from the holiday week should be significant. Consumption of electricity has been running between 4 and 7 per cent above the year-ago figures.

Model 423

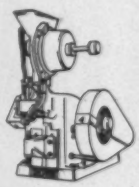
Model 250

MILFORD'S
FLEXIBLE
RIVETER LINE
CAN HELP CUT
YOUR ASSEMBLY
COSTS

Milford adapts to your production line with a wide range of automatic riveters designed to cut assembly costs. Count on Milford's versatility to come up with answers you need at substantial cost savings over other fastening methods. Write for more information.


Model 72

Model 53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Model 56

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MILFORD, CONNECTICUT . • HATBORO, PENNA.
ELYRIA, OHIO • AURORA, ILL. • NORWALK, CALIF.

WELDED STAINLESS TUBING SELLS THIS BOAT RAIL PACKAGE

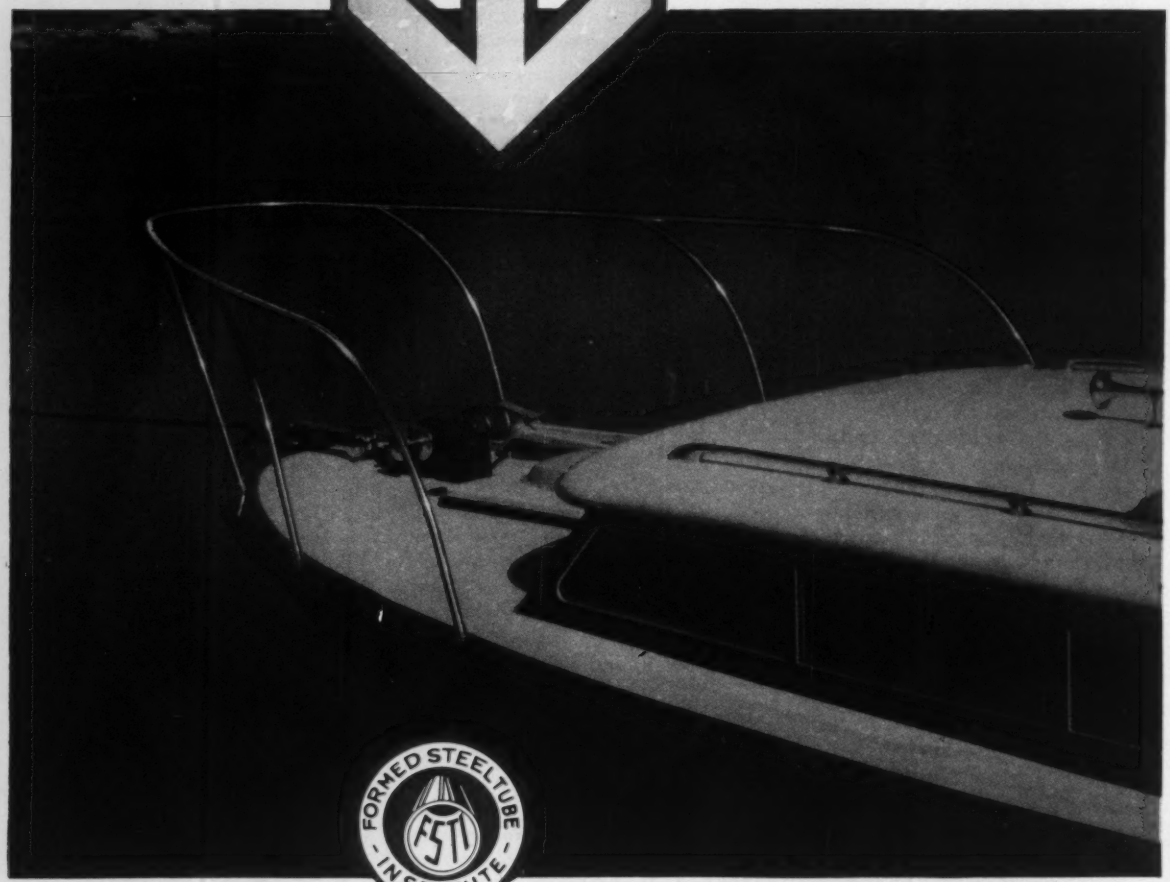
DESIGN WITH *WELDED* TUBING

What's new in welded stainless tubing design? For one—this eye-catching package for pleasure boats.

Out of 1-inch stainless tubing and imagination, gleaming bow rails are now available in pre-cut, preformed package units ready for quick assembly on the decks they'll beautify.

Because welded stainless tubing is practical in price, uniform in dimension and furnished in a range of compositions and tempers, it is a designer's joy to work with. Remember this modern, strong, ever-bright and easy to clean material in your next project —and specify that it be supplied by a quality producer of welded steel tubing! • *Meanwhile, write for detailed Bulletin 8591.*

LC-604



FORMED STEEL TUBE INSTITUTE - FSTI

FORMED STEEL TUBE INSTITUTE, INC.

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• Armco Steel Corp. • The Babcock & Wilcox Co., Tubular Products Div. • The Carpenter Steel Co., Alloy Tube Div. • Clayton Mark & Co. • Damascus Tube Co. • Jones & Laughlin Steel Corp., Electricweld Tube Div. • National Tube Div., United States Steel Corp. • Ohio Seamless Tube Div. of Copperweld Steel Co. • Republic Steel Corp., Steel and Tubes Div. • Revere Copper and Brass Inc., Rome Manufacturing Company Div. • Sawhill Tubular Products, Inc. • Southeastern Metals Co. • The Standard Tube Co. • Superior Tube Co. • Trent Tube Co., Subs. Crucible Steel Co. of America • Union Steel Corp. • Van Huffel Tube Corp. • Wall Tube & Metal Products Co.

WILLIAM RODGERS
Republic's chief metallurgist

SAMUEL W. BROWN
Rockwell plant manager

EDWIN F. SHELLEY
U. S. Industries exec.

R. A. SHAW
American Bridge v. p.-mfg.

William Rodgers was appointed chief metallurgist of **Republic Steel Corp.**, Cleveland. Former assistant chief metallurgist, he succeeds the late **Earle C. Smith**, former chief metallurgist and director of research. **Andrew G. Forrest** succeeds Mr. Rodgers.

Samuel W. Brown, assistant general manager of the Uniontown, Pa., plant of **Rockwell Mfg. Co.**, was named general manager.

Joseph B. Elliott was appointed president and general manager, **York Div.**, Borg-Warner Corp., York, Pa. He succeeds **Henry Haase**, transferred to Borg-Warner central office in Chicago.

Pacific Semiconductors, Culver City, Calif., subsidiary of Thompson Ramo Wooldridge Inc., elected three vice presidents. They are **Lawrence T. Lindgren**, manufacturing; **Dr. John W. Peterson**, research and development; **Sidney L. Spiegel**, marketing.

Robert F. Kendall was named director of purchases, **Reliance Electric & Engineering Co.**, Cleveland.

James M. McFadden, controller of **Fluid Packed Pump Co.**, division of National Supply Co. at Los Nietos, Calif., was appointed general manager of the division. He succeeds **Sidney A. Shuman**, transferred to Pittsburgh as assistant to the president of National Supply.

F. L. Turk was made purchasing agent for **Joy Mfg. Co.**'s New Philadelphia, Ohio, plant, Industrial Div.

Edwin F. Shelley, president of USI Robodyne Div., was appointed a group officer and vice president of the parent company, **U. S. Industries Inc.** He now has executive supervision over USI Western Design Div., Santa Barbara, Calif.; USI Technical Center, Pompano Beach, Fla.; and USI Office of Government Programs, New York, in addition to the USI Robodyne Div. which he has headed since 1958.

David J. Pezdirtz, former metallurgical research engineer with Battelle Memorial Institute, joined **Globe Steel Abrasive Co.**, Mansfield, Ohio, as chief metallurgist and manager of metal abrasive quality control.

Edward Kaufholz was named director of sales, Control Switch Div., **Controls Co. of America**, Schiller Park, Ill.

Stanley E. Fey was made general manager, **K-G Equipment Co.**, Allentown, Pa., division of Air Products Inc.

Russell F. Hendrick was made assistant manager-Pacific Coast, **Macwhyte Wire Rope Co.** He is in San Francisco.

Harry Mussun was made director of machine tool sales, **Kempsmith Machine Co.**, Milwaukee.

Matthew M. Gouger was elected executive vice president of **Frick Co.**, Waynesboro, Pa. A vice president of General Aniline & Film Corp., New York, Mr. Gouger was formerly president of DataGraphic Systems Inc., Santa Monica, Calif.

R. A. Shaw was appointed vice president - manufacturing, **American Bridge Div.**, U. S. Steel Corp., Pittsburgh. Former executive assistant to the president of the division, he succeeds **R. B. Hunter**, retired.

D. B. Kitchel was made assistant general purchasing agent of **Kaiser Steel Corp.**, Oakland, Calif. He was purchasing agent at the Fontana, Calif., Works.

Stephen Mucha was named to the new post of sales manager, **Rodney Davis Gear Co.**, Philadelphia. He was in charge of sales at Foster Equipment Co.

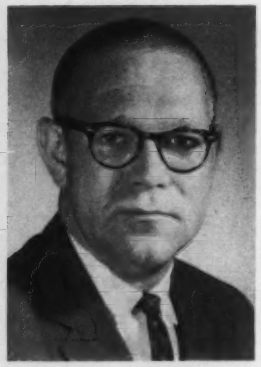
R. F. Protiva was named manager of the Cleveland plant of **Heil Process Equipment Corp.**

Carl J. Demrick was appointed president, **Hurd Lock & Mfg. Div.**, Avis Industrial Corp., Detroit. He was president of Amplex Div., Chrysler Corp., and vice president in charge of manufacturing, Plymouth Div.

Chrysler Corp., Detroit, appointed **William P. Balthrop** president of its Amplex Div. to succeed **C. J. Demrick**, resigned. Mr. Balthrop was manufacturing manager, Trenton, N. J., Engine Plant. **C. J. Quinlan** was named group purchasing agent for Chrysler's Power Train Mfg. Group. Mr. Quinlan was purchasing agent, Axle & Transmission Div.

Willard Roth was made assistant chief engineer for industrial furnaces and equipment by **Sunbeam Equipment Corp.**, Meadville, Pa. He was

CHARLES R. ONSRUD
Onsrud Machine Wks. pres.



JERRY P. ANDERSON
Allison Steel Mfg. sales

GORDON H. CLAYTON
Vickers v. p.

ROBERT G. BIRKIN
Cleveland Crane & Eng. post

manager of engineering, Industrial Div., Lindberg Engineering Co.

Charles R. Onsrud was elected president, **R. F. Onsrud** chairman of **Onsrud Machine Works Inc.**, Niles, Ill.

Jerry P. Anderson was named sales manager for **Allison Steel Mfg. Co.**, Phoenix, Ariz. He held purchasing and sales posts for nine years at Kaiser Steel Corp.'s Fontana and Montebello, Calif., plants.

Gilbert S. Barry, Patrick Bass, and **William E. McComas** have been added to the Los Angeles sales staff of **Tubesales.**

T. E. Goodyear was made sales manager, St. Louis district, **Wolverine Tube Div.**, Calumet & Hecla Inc.

Joseph R. Smith was made sales manager, Industrial Products Div., **Westinghouse Air Brake Co.**, Wilmerding, Pa. He was division sales manager, Miller Fluid Power Div., Flick-Reedy Corp.

Gordon H. Clayton, general manager, Electric Products Div., **Vickers Inc.**, Detroit, was elected a vice president of the company.

Charles B. Pickering was made product manager of numerical control systems for **Diehl Mfg. Co.**, Somerville, N. J.

Sidney Gondelman was elected president and chief executive officer of **Central Foundry Co.**, Holt, Ala. He succeeds the late **John J. Nolan Jr.**

J. R. Roberts Jr. was named president of **Indar Corp.**, Indianapolis, subsidiary of P. R. Mallory & Co. Inc. He was manufacturing superintendent and chief industrial engineer for Mallory Metallurgical Co.

Edward E. Sigg was named vice president - manufacturing, **Mechanical Specialties Co.**, Los Angeles. He recently returned to Mechanical Specialties after spending 14 months as shop superintendent for Dunkle Tool & Die Co.

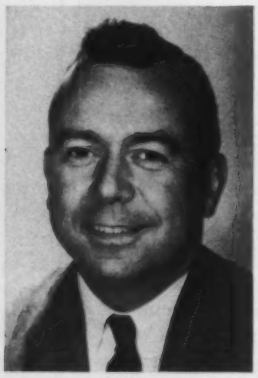
Robert G. Birkin was made general sales manager, **Cleveland Crane & Engineering Co.**, Cleveland, and **J. G. Frischkorn** was made sales manager following consolidation of company sales activities into one sales department. Mr. Birkin was sales manager, Heavy Machinery Div. Mr. Frischkorn was sales manager, Cleveland Tramrail Div.

Justice Lockwood succeeds **James F. Ackerman,** retired, as vice president of **American Brass Co.**, Waterbury, Conn., subsidiary of Anaconda Co. **Allen W. Rockwell,** vice president-New England sales region, succeeds Mr. Lockwood as vice president-sales. **Carl E. Woodward,** director of market planning, was appointed assistant to the president.

Kenneth B. MacNaughton was made general sales manager, rolling mill products, **Steel Co. of Canada Ltd.**, Hamilton, Ont. He was assistant general sales manager.

J. Russell Juten, William Keller, and **Eugene Koenig** were appointed vice

JOSEPH R. SMITH
Westinghouse Air Brake post



J. R. ROBERTS JR.
Indar president

EDWARD E. SIGG
Mechanical Specialties v. p.

KENNETH B. MacNAUGHTON
Stelco sales appointment

You Can Afford Borg-Warner Quality...

A Borg-Warner QUALITY-RATED Crane

$3990.00

For a 3-ton, 34 ft. Span (with 5' overhang each end) Underhung, Motor Driven Industrial Service Crane

The ideal crane for your pre-engineered steel frame buildings.

Here's a crane that's tailor-made for the popular pre-engineered, steel frame building. Overhang at both ends of the bridge beam permits installation for maximum hook coverage with greatest height under the hook in this type of building. And, "Borg-Warner QUALITY-RATED" is your assurance of maximum performance, reliability and long life.

If you are planning a plant addition, a new plant or modernization of existing facilities, it will pay you to get complete information and costs on Borg-Warner QUALITY-RATED Cranes. There's a type and size to suit your needs.

QUALITY-RATED CHECK LIST

- √ Full 3-ton rating with ample reserve capacity.
- √ High carbon steel bridge girder.
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- √ Precision ball and roller bearings throughout.
- √ Channel outrigger with welded diagonal bracing.
- √ Totally enclosed crane and hoist duty motors.
- √ Patented removable axles.

A maximum value at $3990.00

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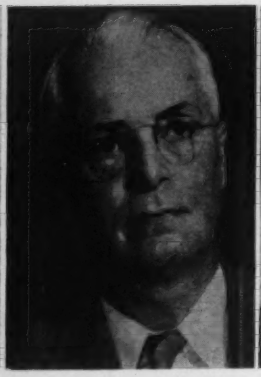
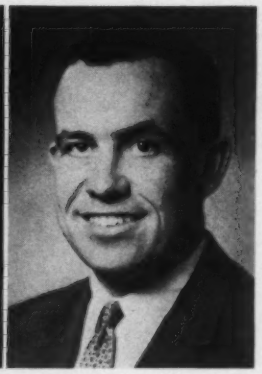
KARL W. WIEDT JR.
Universal-Cyclops gen. supt.



LELAND E. WELLS
Exide v. p.-eng.



A. DONALD MOLL
Minneapolis Elec. Steel post

JOHN H. RICHARDSON
Hughes Aircraft v. p.

HARRY T. BRATT
Clyde Iron Wks. chief eng.

M. R. BOCK
Pullman-Standard purchasing

presidents of **Keuffel & Esser Co.**, Hoboken, N. J..

John H. Richardson was appointed vice president-marketing, **Hughes Aircraft Co.**, Culver City, Calif. He has been marketing director since last July.

Harry T. Bratt was made chief engineer, **Clyde Iron Works Inc.**, Duluth. He was vice president of American Hoist Pacific Co., Seattle.

Albert E. Reed was made vice president-marketing, **W. S. Tyler Co.**, Cleveland, following creation of two separate divisions for marketing woven wire cloth and screening machinery. **F. Truman Thompson** was made sales manager of the new Woven Wire Cloth Div.; **Walter C. Mahlig** assistant sales manager, same division.

F. James Skinner was named a vice president of **Houdaille Industries Inc.** He is president and general manager of Houdaille Industries of Canada.

M. R. Bock was made director of purchasing for **Pullman-Standard Div.**, Chicago, Pullman Inc. He succeeds **J. A. Kummerer**, vice president-purchasing, retiring from that post but continuing with the company as assistant to the president. Mr. Bock has been general purchasing agent since 1959.

Frank Weston was made chief industrial engineer of **Acme Steel Co.'s** principal plant at Riverdale, Ill. He succeeds **Claude W. Campbell**, recently named director of industrial engineering for the company and subsidiaries.

Hicks B. Waldron was made manager of the Plainville, Conn., plant of **General Electric Co.'s** Distribution Assemblies Dept.

R. W. Hodgers Jr. was named manager of engineering for **General Electric Co.'s** X-Ray Dept., Milwaukee. He succeeds **M. A. Edwards**, transferred to Schenectady, N. Y., as manager, advanced product planning, Electronics Component Div.

Karl W. Wiedt Jr. was named general superintendent, mills and finishing, and **Andrew T. Shack** manager, plant administration at the Bridgeville, Pa., plant of **Universal-Cyclops Steel Corp.**

Leland E. Wells, former director of engineering, **Exide Industrial Div.**, Electric Storage Battery Co., Philadelphia, was promoted to vice president-engineering of the division.

A. Donald Moll was appointed sales manager, **Minneapolis Electric Steel Castings Co.**, Minneapolis. He was assistant sales manager.

J. A. Farnsworth was named manager, **Mead-Morrison Div.**, Harrison, N. J., McKiernan-Terry Corp. He joined the division in 1956 as mid-Atlantic sales engineer.

OBITUARIES...

Joseph W. Fribley, 73, founder and president, **Cleveland Cap Screw Co.**, Cleveland, died June 6.

Foster W. Lamb, 54, general sales manager, **Chicago Hardware Foundry Co.**, North Chicago, Ill., died May 8.

Carleton D. Tucker, 58, purchasing agent, **R. C. Mahon Steel Co.**, Detroit, died May 23.

William S. Jack, 71, founder of **Jack & Heintz Inc.**, Cleveland, and later of **Bill Jack Scientific Instrument Co.**, Solana Beach, Calif., died June 4.

Joseph S. Mohr, 62, regional sales manager for **General Refractories Co.**, Chicago, died May 22.

Gottfried Adolphson, 87, founder and chairman, **Great Lakes Pressed Steel Corp.**, Buffalo, died May 27.

Burnell L. Verner, 53, vice president of **Luria Bros. & Co.**, and head of the Pittsburgh office, died May 28.

Daniel A. Cummings, 60, vice president-manufacturing, **Vlchek Tool Co.**, Cleveland, died June 1.

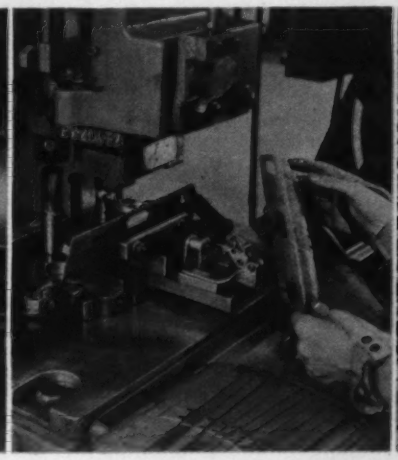
Arthur A. Hupp, 57, Cincinnati branch manager, **Central Steel & Wire Co.**, died May 20.

Royal D. Thomas, 78, chairman of **Arcos Corp.**, Philadelphia, died May 28.

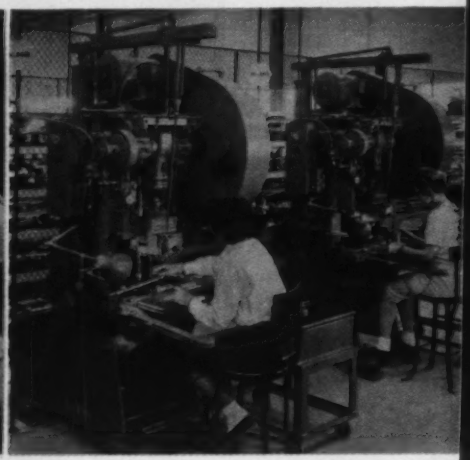
39 OBI'S GIVE PRESS DOLLARS 3-WAY STRETCH

Newly installed Niagara Inclinables provide required precision at lower investment, produce more parts per hour, and cut maintenance to the bone

SERVING ONE OF THE WORLD'S LARGEST typewriter manufacturers in a brand-new plant, 39 new Niagara Series A Open Back Inclinables play a key role in the production of nearly 2000 precision parts for portable machines. With selection based on past experience, these presses are more than living up to expectations . . . performance-wise and dollar-wise.



.001" TOLERANCES ARE MAINTAINED as Niagara OBI's engage in a wide variety of piercing, notching, trimming, bending and intricate forming operations. Here, a hinge tab is given a final bend on a 22-ton Niagara Series A. Rigid press frames and short-coupled, multiple "V" gibs not only insure precise production, but lengthen die life.



BOOSTING PRODUCTION 30%, these fast-acting hand fed OBI's turn out an average of 1300 pieces an hour per machine. The reason: Instant clutch engagement and disengagement at every press stroke provide more working strokes per minute. Niagara's famed multi-point mechanical sleeve clutch picks up the load on 14 engaging jaws and applies driving force concentrically without keys or pins.

EVERYTHING HUMS ALONG SMOOTHLY day after day. Niagara OBI's are unmatched for dependability and safety. With fewer parts and simpler construction, there's less to go wrong . . . less to repair and replace. No complicated electrical circuits, limit switches or solenoids . . . no palm buttons, air valves or rotary connections.

MAINTENANCE IS SHAVED TO AN "ABSOLUTE MINIMUM" according to this Niagara user. Unlike other presses previously utilized, these Series A's do not require constant "doctoring." There's no need for frequent adjustment of the clutch sleeve and brake. No "dogs" to break off and require replacement. No press can match its economy.

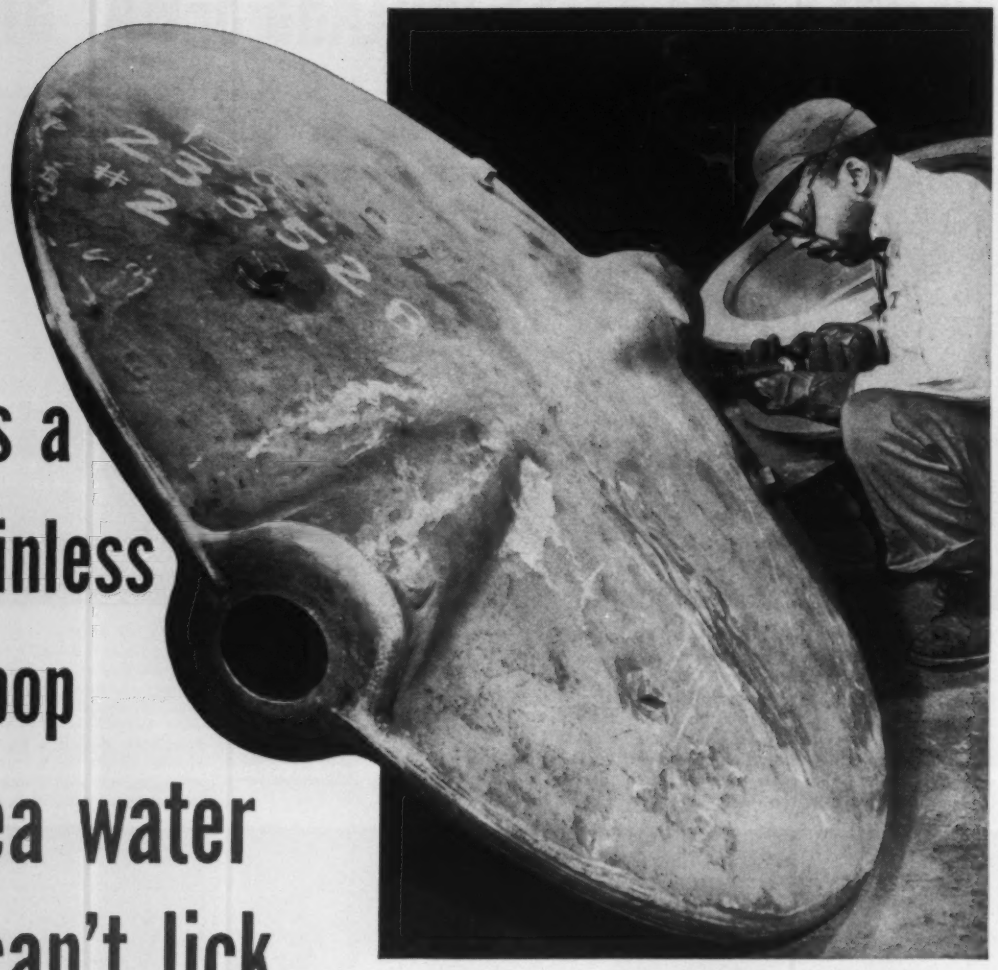
WANT TO STRETCH YOUR PRESS DOLLARS, TOO? Write for illustrated Bulletin 58 containing the facts and figures on Niagara Series A Open Back Inclinable Presses (built in 13 standard sizes with shaft diameters from 1¼" to 6½" and capacities from 5½ to 190 tons). *Niagara Machine & Tool Works, Buffalo 11, N. Y., District Offices and Distributors Everywhere.*

NIAGARA OBI PRESSES

America's most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work.

MMT-PE

Here's a stainless lollipop sea water can't lick



This large (48″ dia., 1701 lbs.) and unusual stainless casting was fabricated by Allegheny Ludlum's Buffalo, N.Y. foundry. It is scheduled for service under the most severe operating conditions, functioning as a wafer valve disc at 25 psi pressure in sea water. Since long life and tight closing are essential in this application, corrosion resistant Type 304 Allegheny Stainless was specified.

Some unusual techniques were employed in the fabrication of this casting. Although the entire valve disc was cast as a single piece, its sides are hollow, with a skin only ¾″ thick. The center shaft was cast solid at the same time the side wings were cored, permitting the single piece, seamless part desired.

If you have a casting problem, or *any* problem that involves corrosion resistance, long life, resistance to wear and abrasion, call the Allegheny Ludlum Sales Office nearest you. An A-L Sales Engineer is ready to put his skills and those of the A-L Technical Staff promptly at your disposal, to serve your requirements from the largest and most complete line of stainless products on the market.

Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pennsylvania.

6663

Write for this 28-page booklet on A-L STAINLESS CASTINGS

28 pages of valuable and complete data on stainless castings: analyses, properties, technical data on handling and heat treatment, typical applications, how to order, etc.

ADDRESS DEPT. S-6-2

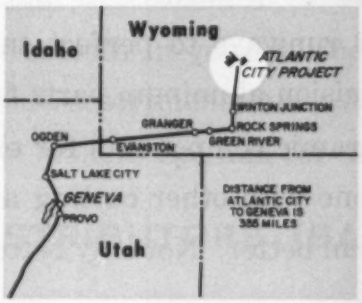
Make it BETTER and LONGER LASTING with

ALLEGHENY STAINLESS

AL

Continental Divide Forms Backdrop For Iron Ore Mining Project

COLUMBIA - GENEVA STEEL Div., U. S. Steel Corp., is constructing an iron ore mining and beneficiating facility in Fremont County, Wyo. Known as the Atlantic City Project, the location is 8300 ft above sea level in the Wind River Mountains. The ore body itself lies near the point where the Oregon Trail crosses the Continental Divide and not far from the ghost towns of Atlantic City and South Pass City. The photo above shows the site for the new operations.



The extensive ore mining, concentrating, pelletizing operations are scheduled for completion late in 1962. The facility will supply pelletized iron ore to the division's integrated steel plant at the Geneva Works, near Provo, Utah. The ore will supplement Geneva's present source from mines near Cedar City, Utah.

• **Facilities**—Besides open pit mining operations, major units slated for construction include crushing and screening facilities, an ore concentrating plant, a pelletizing plant, an extensive water storage and handling system, loading and shipping facilities. General and mine office buildings, maintenance shops, a warehouse, testing laboratory, dispensary, fire and ambulance station will also be built.

• **Processes**—Conventional open pit methods will be used to mine the ore which contains about 30 per cent iron. The ore will be crushed, then conveyed to the concentrating plant where it will be magnetically concentrated to more than 60 per cent iron.

The ore concentrate will be pelletized and shipped via a new 76 mile railroad spur to the Union Pacific line at Winton Junction which serves the coal mining district just north of Rock Springs, Wyo. The ore will travel by rail the rest of the 355 miles to the blast furnaces at Geneva Works.

Barber-Colman Expanding

Barber-Colman Co., Rockford, Ill., will expand plant facilities for the production of automatic controls, air distribution products, overhead doors, and industrial instruments. The plant area will be increased about 170,000 sq ft.

McLouth Boosts Capacity

McLouth Steel Corp., Detroit, has its new oxygen converter in operation. This 110-ton capacity unit was built by Pennsylvania Engineering Corp., New Castle, Pa. It supplements production of five other converters at McLouth (two of 110-ton capacity and three of 60-ton capacity).

Installs Extrusion Press

Pacific Extrusions Inc., Watsonville, Calif., installed a 1000 ton press which will permit the firm to extrude 600,000 lb of aluminum a month. The equipment can produce shapes in cross sections of up to 4.5 in. The company is an affiliate of Aluminum Extrusions Inc., Charlotte, Mich.

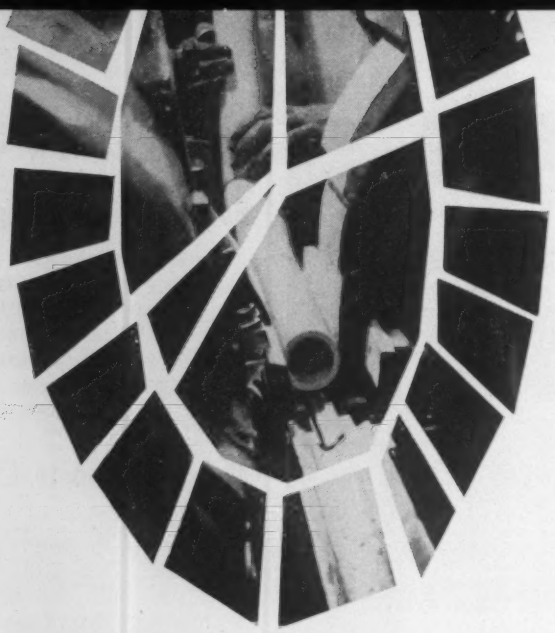
Wire Drawer Expands

Fort Wayne Metals Inc., Ft. Wayne, Ind., producer of stainless alloy wires, will build a 90,000 sq ft plant. Construction on the first 30,000 sq ft "module" will begin this summer. It will be in operation before mid-1961.

Modernizing Shipyard

Bethlehem Steel Co., Bethlehem, Pa., is modernizing its San Pedro (Calif.) ship repair facility. Berthing space and dry docking capacity are being expanded. Three reinforced concrete piers to accommodate tankers up to 750 ft long are slated for completion early in 1961. A fourth will provide mooring for an existing 15,000 ton sectional dry dock. One is proposed to accommodate tankers up to 46,000 dead weight tons. Ships under repair will be serviced by tower cranes and complete utilities, including

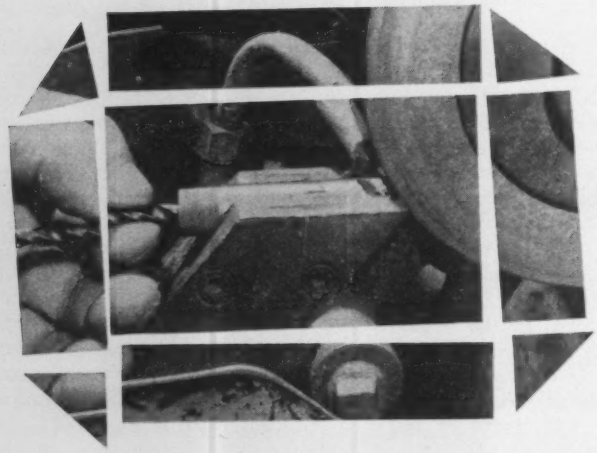
(*Please turn to Page* 144)

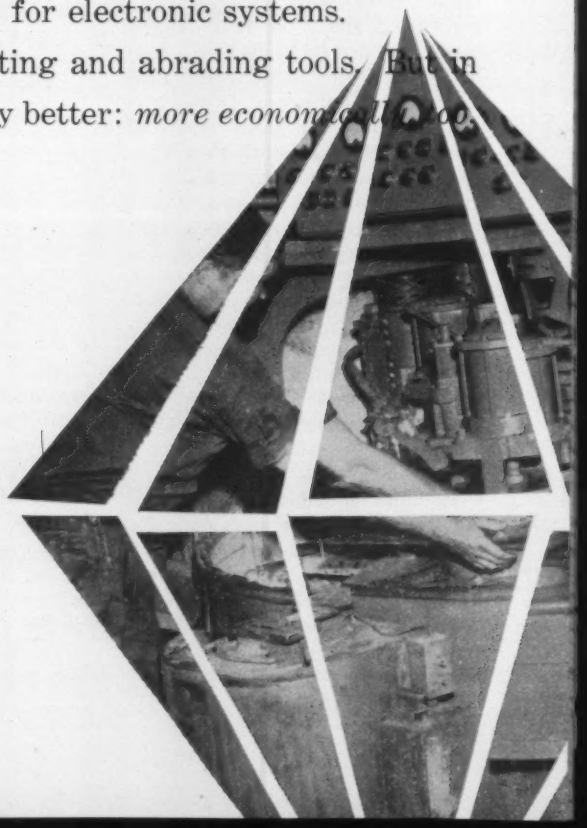


DIAMONDS AT WORK

Industrial diamonds are, first and foremost, *tools.* They're used in many ways to do many jobs. Diamonds keep hardest carbide tools sharp and efficient. Diamond wheels shave jet runways to perfect smoothness. Diamond tools speed up production of precision aluminum parts for automobiles. Diamonds machine close-tolerance ceramic components for electronic systems.

These jobs *could* be done with other cutting and abrading tools. But in every case, diamonds do them better. Not only better: *more economically, too.*

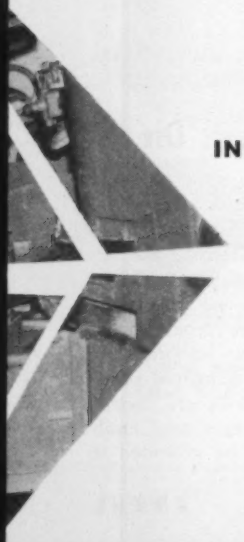




Industrial diamonds last longer, work more efficiently than anything else. If that's not economy, what is?

If you cut, sharpen, or smooth in your business, you can probably use diamonds to advantage. Wide assortments are available in any quantity to your diamond wheel and tool maker. See him for more information.

INDUSTRIAL DISTRIBUTORS (SALES), LTD.



INDUSTRIAL DIAMONDS CUT PRACTICALLY EVERYTHING . . . ESPECIALLY YOUR PRODUCTION COSTS

Industrial Distributors (Sales), Ltd., is the world distributor of natural industrial diamonds . . . the most efficient cutting, polishing and abrading substance known to man. Industrial Distributors sponsors the Diamond Research Laboratory. Its work is devoted exclusively to investigations on all phases of the diamond. The Laboratory stands ready to offer information and assistance to all users of industrial diamonds. Please address your inquiries to: The Diamond Research Laboratory, P.O. Box 104, Crown Mines, Johannesburg, Union of South Africa.

20 tons

OF OIL-SMOOTH PULLING POWER

NEW Snap-on Hydraulic Puller saves downtime, cuts costs

The new SNAP-ON 20-ton hydraulic puller handles hundreds of pushing, pulling and pressing jobs quickly and safely. No more galled shafts — no more damaged parts through heating, prying or hammering. Even the tightest pressed fits are off with a few easy strokes of the handle — downtime can be cut from hours to minutes.

Hydraulic ram is threaded near the top for attachment of various yokes and adaptors for different jobs. Ram and adaptor can be used on the outside of a puller yoke. This is an exclusive feature and provides 6-in. longer reach than competitive units.

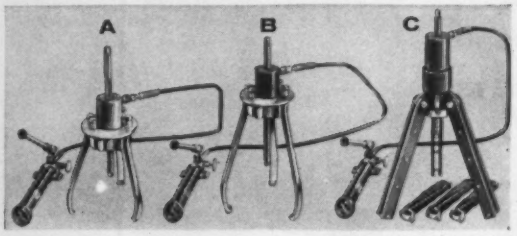
Another important feature is the accumulator sack on the pump. It permits operating pump in any position, eliminates back pressure and keeps oil free from contamination.

Ram and pump assembly is available separately or with your choice of a wide range of pullers — combination 2- and 3-jaw yoke-type, bar-type, and floor press, together with wide assortment of adaptors. Many of the SNAP-ON pullers you now have can be used with this hydraulic set. Get full details from your SNAP-ON representative or write for new literature.

FOR ALL INDUSTRY

SNAP-ON TOOLS

8121-F 28TH AVENUE • KENOSHA, WISCONSIN



SNAP-ON CG-420 ram and pump assembly shown with A, the CG-400 puller with 9½-in. reach and 13-in. spread; B, the CG-405 puller with 14-in. reach and 15-in. spread; C, the CG-425 heavy-duty puller with 19-in. reach and 20-in. spread.

(*Concluded from Page* 141)

power, steam, water, air, and burning gases.

Reynolds Moves Division

Reynolds Metals Co., Richmond, Va., will consolidate all activities of its Architectural Sales & Mfg. Div. in Louisville on June 18. The division is responsible for the manufacture and marketing of Reynolds aluminum curtain wall products. E. J. Tangredi is general manager of the division.

Gearmaker Lifts Capacity

Cincinnati Gear Co., Cincinnati, is building a 10,000 sq ft addition to its plant at Mariemont, Ohio. Cost of the improvement: $200,000, not including additional machine tools and other equipment.

Builds Service Center

Republic Supply Co. of California, Los Angeles, is constructing a $250,000 branch facility at 5400 83rd St., Sacramento, Calif. The service center will primarily serve private and municipal water companies and pipeline contractors.

Resumes Zirconium Output

Columbia-National Corp. is resuming production of zirconium sponge at its Santa Rosa plant near Pensacola, Fla. Zirconium sponge produced at the Florida facility is required in the manufacture of Zircaloy, an alloy used in the construction of nuclear reactors. Columbia-National has a contract with the Atomic Energy Commission for the supply of 700,000 lb of zirconium sponge annually. It extends to June 30, 1963.

Forms Instruments Div.

Micro-Path Inc., a wholly owned subsidiary of United Industrial Corp., Los Angeles, has formed an Instruments Div. following the acquisition of manufacturing and distribution rights to all electronic and chemical devices produced by the Robert R. Austin Laboratories, San Gabriel, Calif. Principal products of the laboratories are instruments for gas detection and analysis. The line will be extended to

IPC
molds the tough ones . . . leather or synthetic!

The "Custom" approach, already made famous by IPC oil seals and packings is *also* reflected when IPC tackles unusual molded shapes. If you require an unusual molding from rubber or synthetic material, *or* if you need a seal of special shape and specific properties, IPC *can* help you. By using the "custom" approach IPC will actually develop a tailored product to suit your application.

Wide experience in compounding synthetic materials gives IPC a distinct edge in developing special seals or molded shapes. IPC leather products incorporate top grade materials and elaborate laboratory control.

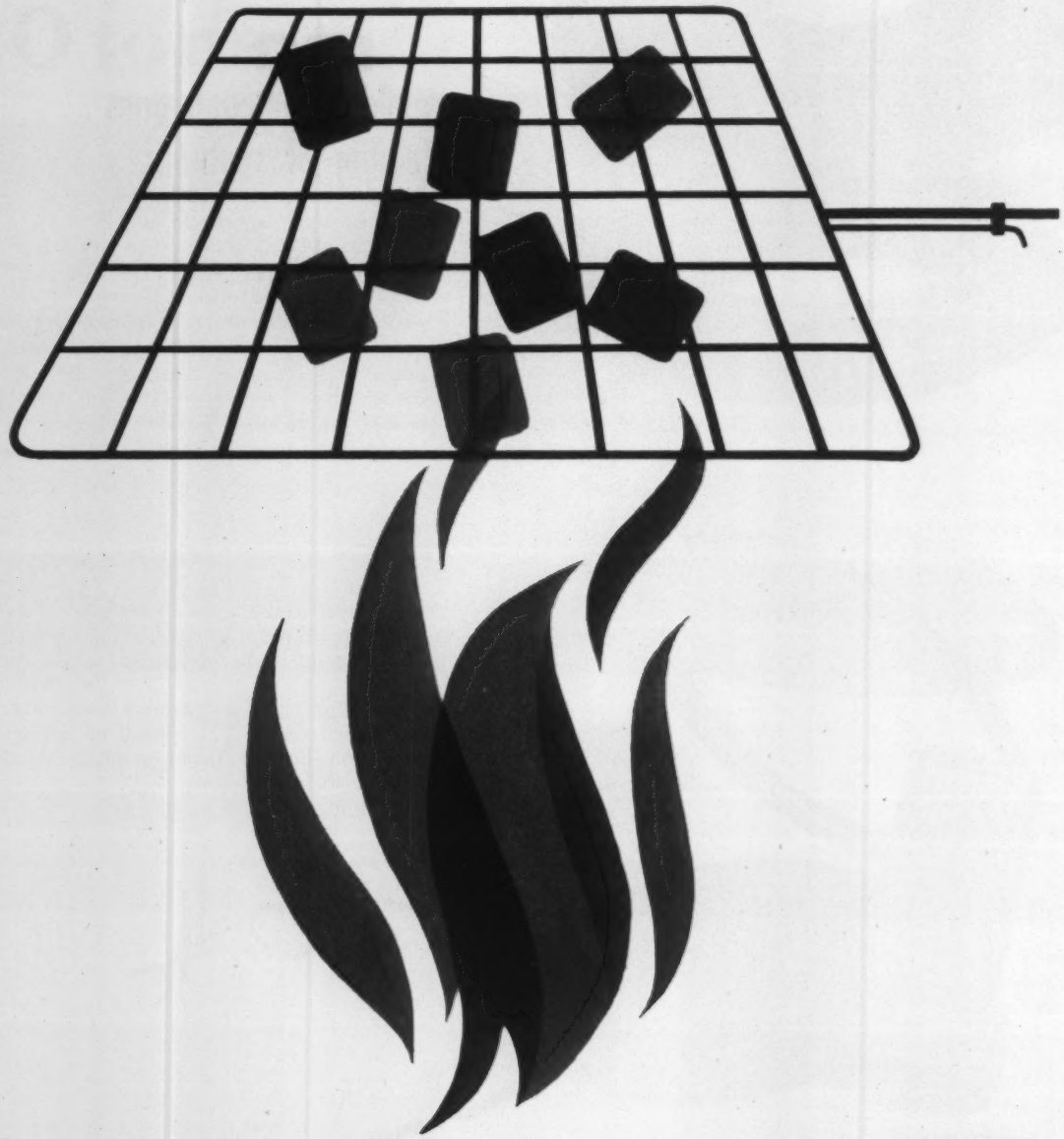
When you feel you have a tough nut to crack, call on IPC . . . We'll be happy to show you unusual *custom molding* samples, at your request.

OIL SEALS
PACKINGS
PRECISION MOLDING
Custom designed . . . for your application

IPC

INTERNATIONAL PACKINGS CORPORATION
Bristol, New Hampshire

P3



toasted nickel briquettes for low H_2 diet

Sherritt's recipe for making low-hydrogen nickel is as effective as it is simple: take pure nickel powder, press into uniform briquettes, and heat for a quarter of an hour at 1650°F. The result: pure nickel in its handiest form, with scarcely a trace of hydrogen. High-purity Sherritt nickel is also available in three standard grades of powder, special grades, and coated powders.

FOOTE MINERAL COMPANY *is the exclusive sales agent for Sherritt nickel and cobalt in the United States and Canada. For complete illustrated brochure with prices and delivery information, contact the Foote Mineral Company, 411S Eighteen West Chelten Building, Philadelphia 44, Pa.*

SHERRITT GORDON MINES LIMITED

include industrial instrumentation, medical electronics, and instruments for the petroleum-petrochemical industries, and missile application.

Changes Name to Stanray

Standard Railway Equipment Mfg. Co., Chicago, changed its name to Stanray Corp.

ASSOCIATIONS

American Gear Manufacturers Association, Washington, elected these officers: President, J. F. Murray, Winsmith Inc., Springville, N. Y.; vice president-Products Div., C. F. Bannan, Western Gear Corp., Lynwood, Calif.; vice president-Technical Div., Folke Richardz, Westinghouse Electric Corp., Pittsburgh; and treasurer, J. H. Harper, Jackson Gear Co., Pittsburgh.

American Tin Trade Association elected these officers: President, Heinrich Meyer, Ayrton Metal & Ore Corp.; treasurer, J. J. Jennings, National Lead Co.; and vice presidents, W. D. Long Jr., A. Strauss & Co., and M. W. Tuthill, Tuthill & Co., all of New York.

S. A. Cappon, Screw Products Div., National Acme Co., Cleveland, has been elected chairman of the Lake Erie District, **National Screw Machine Products Association,** Cleveland.

G. E. Ellsworth, Toronto Iron Works, Toronto, Ont., has been elected president of the **Canadian Institute of Steel Construction Inc.,** Montreal, Que.

NEW PLANTS

Metal & Thermit Corp., New York, will build a $500,000 plant in Tampa, Fla. It will be operated by the firm's Detinning Div.

U. S. Drill Head Co., Cincinnati, is constructing a 29,000 sq ft plant at 5298 River Rd., that city. Occupancy of the structure by Sept. 1 will mark completion of a $750,000 building program started in 1957,

(*Please turn to Page* 150)

HEAVY DUTY YARD AND FACTORY TRAILERS
INDUSTRIAL CARS AND TURNTABLES
CAPACITIES FROM 2 TO 600 TONS
CUSTOM BUILT
46 YEARS OF SERVICE TO HEAVY INDUSTRY
CROSS-BAY® MOTOR-DRIVEN CARS
DESIGNED AND BUILT FOR LASTING SERVICE
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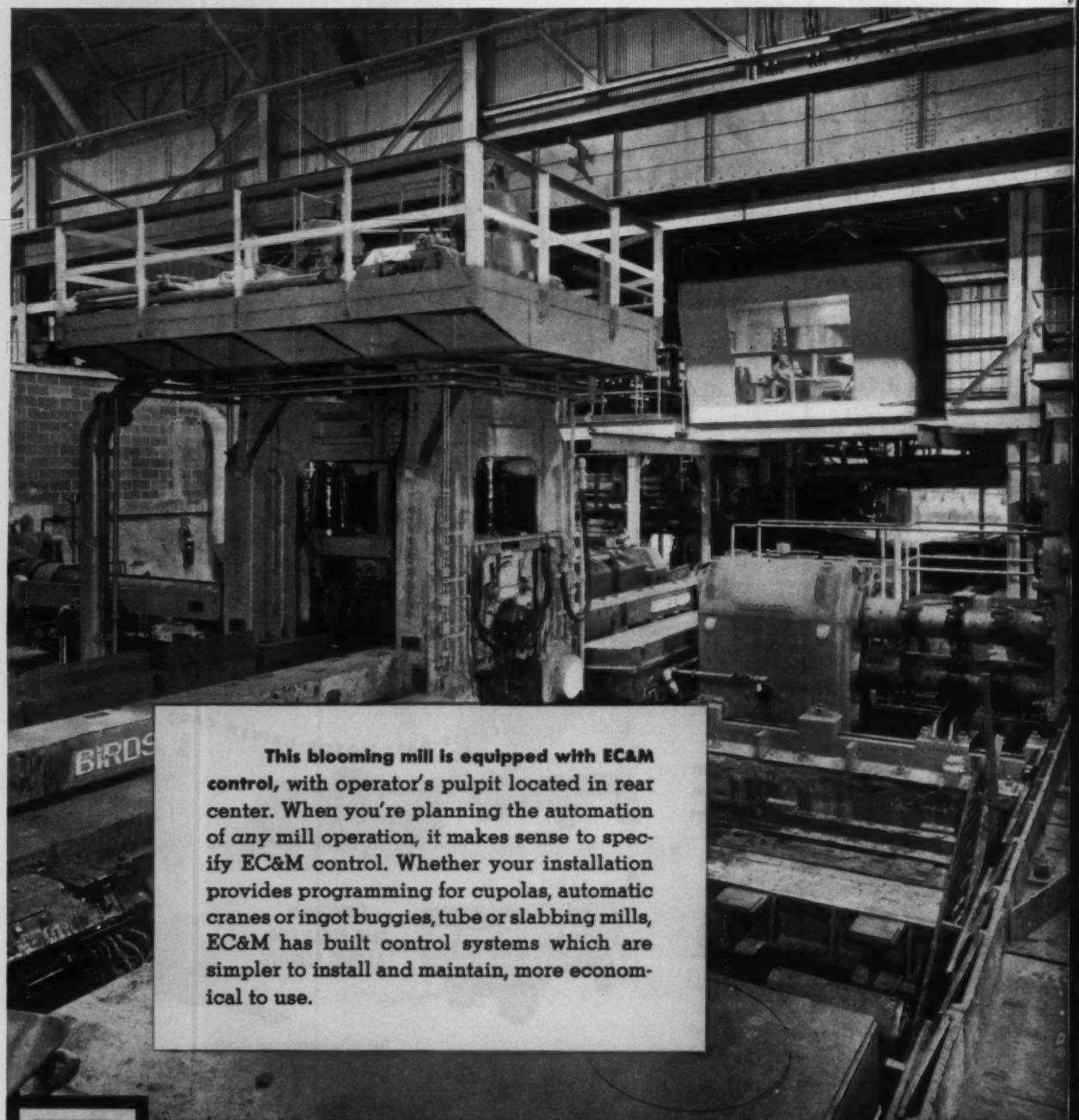
Complete Mill Automation is Simpler,



This blooming mill is equipped with EC&M control, with operator's pulpit located in rear center. When you're planning the automation of *any* mill operation, it makes sense to specify EC&M control. Whether your installation provides programming for cupolas, automatic cranes or ingot buggies, tube or slabbing mills, EC&M has built control systems which are simpler to install and maintain, more economical to use.

SQUARE D COMPANY

EC&M DIVISION • CLEVELAND 28, OHIO

Less Expensive with EC&M Control

Minimum set-up time saves many man-hours of work. Each EC&M system is thoroughly engineered, tested and adjusted at the factory.

Accuracy and reliability make your production job easier and more profitable. Heavy-duty mill-type components are used throughout. In addition, Square D's new Norpak static control is widely used in EC&M systems for virtually maintenance-free operation.

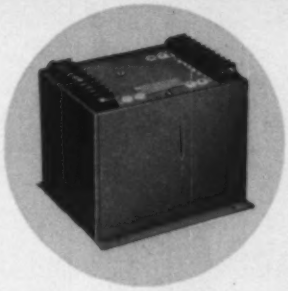
Simple operation means that new operators can be trained quickly. For instance, EC&M automatic screwdown systems are equipped with easy-to-use push button controls, and programming is available by either punched cards or slider panels. Direct reading eliminates coding and de-coding, and there are no schedules to memorize.

Systems for any job are built to fit your exact requirements, including new reactor control for stepless hoist installations. EC&M engineers are trained mill specialists who design, build and install the automatic control system that's best for *your* job.

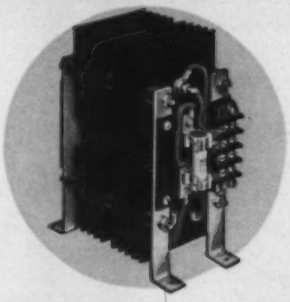
Write for detailed information or contact your local Square D field office for details on EC&M automated mill control systems. Square D Company, EC&M Division, 4500 Lee Road, Cleveland 28, Ohio.

QUALITY COMPONENTS MAKE EC&M SYSTEMS DEPENDABLE

NORPAK,
Square D's new static control, adds extra reliability to EC&M systems. Transistorized NOR units are compact and sealed in Epoxy to keep out foreign matter and moisture. All external connections are positively made by locked-in tapered pin construction.



MAGNETIC AMPLIFIER
is frequently used in place of conventional thyratron and rotating amplifiers. Its rugged construction makes maintenance almost nonexistent. Unlike tube-type amplifiers, magnetic amplifiers are not harmed by vibration, will give top performance indefinitely.



SILICON-CONTROLLED RECTIFIER
combines extremely high gain with very fast response. Like the grid in a thyratron tube, a silicon-controlled rectifier passes current only when a signal is applied. As used in EC&M systems, they provide a high-power output directly to a load.

wherever electricity is distributed and controlled

Eastman Kodak uses...
FEDERAL-WARCO
At Eastman Kodak, Warco straight-side presses turn out millions of close-tolerance, high-quality parts for Kodak cameras and motion picture projectors.
Precision, quality and high volume are Kodak watchwords. Federal-Warco plays a vital role in helping Kodak meet its rigid production requirements consistently.
THE FEDERAL MACHINE AND WELDER COMPANY
Warren, Ohio
Federal WELDERS
Warco PRESSES

(*Concluded from Page* 147)

says A. P. Speckin, president. About two-thirds of the building will house manufacturing facilities; the remainder, offices and engineering department.

Westinghouse Electric Corp., Pittsburgh, officially opened its multimillion dollar circuit breaker plant in Trafford, Pa. The plant consists of 9 acres under roof, including seven aisles 550 ft long, one of which is 60 ft from ground to roof.

Sola-Basic Products Ltd. opened a $500,000 plant in Etobicoke, Ont. The company is an affiliate of Basic Products Corp., Milwaukee, and makes transformers, lighting ballasts, constant current regulators, and laboratory furnaces. The line will be extended to include direct current power supplies.

American Welding & Mfg. Co., Warren, Ohio, opened a 30,000 sq ft manufacturing plant on the West Coast under the name of Amweld California Inc. H. H. Alden, vice president and treasurer of the parent firm, becomes president of the new company.

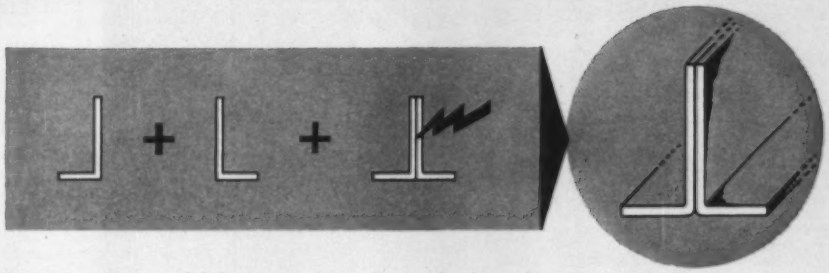
VACATIONS

Radio Corp. of America, Camden, N. J., will close these manufacturing plants from July 18 through July 31: DEP Airborne Systems Div., Camden, N. J.; DEP Missile Electronics & Controls Div., Burlington, Mass.; DEP Missile & Surface Radar Div., Moorestown, N. J.; Industrial Electronic Products, Canonsburg, Pa., and Camden; Electron Tube Div., Harrison, N. J., Lancaster, Pa., Woodbridge, N. J., and Cincinnati; Semiconductor & Materials Div., Somerville, N. J., Findlay, Ohio, and Needham, Mass. The Record Div. plants will close July 2 through July 17 at Indianapolis and from July 25 through Aug. 7 at Rockaway, N. J. The Television & Radio "Victrola" Div. will close July 1 through July 17 at Bloomington, Ind., Cambridge, Ohio, Monticello, Ind., and Indianapolis. The Electron Tube Div. plants at Marion, Ind., and Indianapolis will be closed July 1 through July 17 while the Camden, N. J., plant of the RCA

How to save money and time with

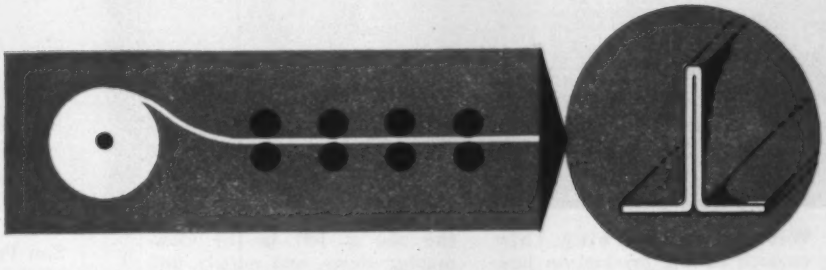
VAN HUFFEL ROLLER DIE COLD FORMED METAL SHAPES

THE SLOW COSTLY WAY



Expensive time and labor are obviously involved in this tee section formed by welding two angles together. Hundreds of more complicated sections can and are being roller die, cold formed by Van Huffel effecting tremendous savings in production costs.

THE FAST LOW-COST VAN HUFFEL WAY



Here's how Van Huffel cold forms sections like this economically, in continuous lengths from roller dies in any of the common metals: hot or cold rolled steel, stainless, high strength steels, coated steels, aluminum, copper or brass; from coiled strip ½" to 33" wide; in gauges from .003 to .312.

MAIL COUPON FOR FREE OPEN SHAPE CATALOG

This 48 page catalog OS-1049 illustrates (actual size) nearly 600 roller die, cold formed metal shapes for which rolls and dies are on hand, thus eliminating tooling costs to the purchaser of any of the shapes illustrated.

Send me catalog OS-1059.

Name ..... Title .....

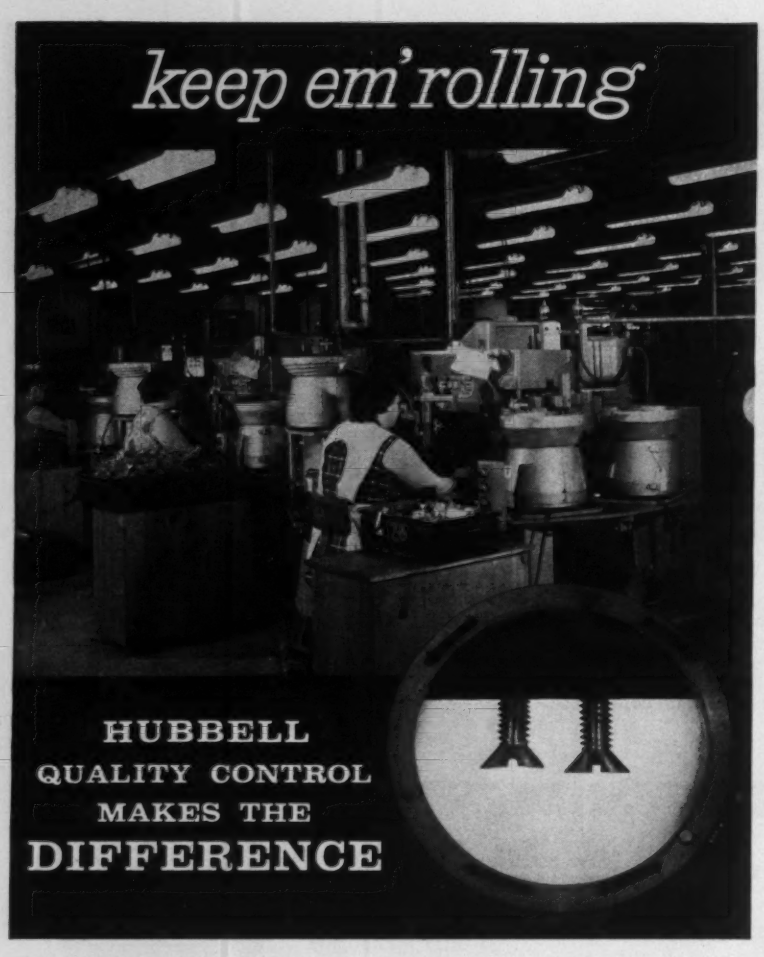
Company .....

Address .....

City ..... Zone .... State .....

VAN HUFFEL
TUBE CORPORATION • WARREN, OHIO

Where ideas have been taking shape in metal for over half a century



Without any warning, this smooth rolling production line could come to a screeching halt . . . all because of one imperfect fastener. You've had it happen all too often. Suddenly an automatic machine clogs and everything stops dead and stays stopped until the clogged machine can be fixed.

Hubbell precision fasteners are your best insurance against production snafus like this, because they are quality controlled at every step of manufacture to provide as uniformly perfect cold headed products as is humanly possible. It's our job to weed out the duds like the one at left in the viewmaster above, and supply uniformly perfect fasteners like the Hubbell one at right.

Contrast the two. Note how the Hubbell fastener at right is completely free of burrs or dirt that might jam an automatic machine. Also see how sharp and clean the threads are, and how deep and precise the slot. All these things add up to faster production, less down time, fewer rejects and a better end product.

Yes, if it's easier to fasten, it's easier and cheaper to assemble. Buy Hubbell precision fasteners and see.

IT PAYS TO HAVE HUBBELL GOOD CONNECTIONS

Quality FASTENERS

HARVEY HUBBELL, INCORPORATED
Machine Screw Department, Bridgeport 2, Connecticut

See the Hubbell Fastener Catalog in Sweet's Product Design File 7/Hu.

Parts & Accessories will be closed July 9 through July 24.

Lamp Div., Westinghouse Electric Corp., Bloomfield, N. J., will close the last two full weeks in July (from the close of business July 15 to Aug. 1).

Sikorsky Aircraft Div., United Aircraft Corp., Stratford and Bridgeport, Conn., will close its offices and factories from July 22 to Aug. 8.

Waldes Kohinoor Inc., Long Island City, N. Y., will be closed from July 4 to July 18, inclusive. The firm's sales, order, and shipping departments will keep on token crews to provide necessary services.

I-T-E Circuit Breaker Co. will close its Philadelphia divisions from the close of business July 22 to Aug. 8. A skeleton force will handle emergency requirements.

Okonite Co., Passaic, N. J., announces these vacation schedules: Passaic, Paterson, and North Brunswick, N. J., factories will close from July 10 through July 24; the Kennecott Wire & Cable Div., Phillipsdale, R. I., from July 31 to Aug. 16. Emergency shipments of wire and cable items in stock at the factories will be made. Okonite warehouses in Birmingham, Chicago, San Francisco, Syracuse, N. Y., and Wilkes-Barre, Pa., will make regular shipments of stock items of wire, cable, and splicing tapes.

NEW ADDRESSES

Black & Decker Mfg. Co., Towson, Md., moved its Salt Lake City, Utah, factory service branch to 1541 S. Second West St.

American Chain & Cable Co. Inc., New York, moved its Chicago district sales office and warehouse facilities to 2040 N. Hawthorne Ave., Melrose Park, Ill.

Engineered Electronics Co. moved to 1441 E. Chestnut Ave., Santa Ana, Calif.

Green Instrument Co. moved its plant to 295 Vassar St., Cambridge, Mass.

In this fine contemporary AMERICAN stainless tableware

quality begins with

Superior STAINLESS STRIP STEEL

Excellent formability—giving the designer free range for creative styling ... ever-bright luster for lifetime beauty... stay-new appearance, always! These SUPERIOR Stainless qualities are backed by *responsibility in depth* to our customers—for precise uniformity in coil to coil, dependable deliveries, broad technical service. Write us on *your* stainless needs.

The stainless tableware pictured is manufactured by ONEIDA SILVERSMITHS, Oneida, N. Y.

SUPERIOR STEEL DIVISION
OF
COPPERWELD STEEL COMPANY
CARNEGIE, PENNSYLVANIA

For Export: Copperweld Steel International Company, New York

On their way to move men, merchandise—or mountains

For a nation on wheels and on the wing—a production run of forged crankshafts and jet engine compressor wheels for the builders of power-plants for pleasure cars, trucks, earth-moving equipment, and aircraft.

In missile development, too, Wyman-Gordon has proved the value of forging in achieving the highest strength-weight ratios, at elevated temperatures.

With forging experience dating prior to the birth of the internal combustion engine; with the greatest hammer and press capacity in the country; with unexcelled laboratory facilities; Wyman-Gordon is anxious to serve you at the design, engineering and purchasing stages of your developments.

EST. 1883

WYMAN-GORDON

FORGINGS

of Aluminum Magnesium Steel Titanium . . . and Beryllium Molybdenum Columbium and other uncommon materials

HARVEY ILL. WORCESTER MASSACHUSETTS DETROIT MICH.

GRAFTON MASS. FRANKLIN PARK ILL. LOS ANGELES CAL. PALO ALTO CAL. FORT WORTH TEX.

Technical Outlook

MATERIALS NOTE—"We have more than 10,000 steels that aren't being utilized fully by our industry," charges Austin J. Paddock, president, American Bridge Div., United States Steel Corp., Pittsburgh. He suggests great hidden benefits await engineers and designers curious enough to test them in new applications before turning to more costly, exotic metals.

ELECTRON BEAM GROWS— Electron beam welds 20 to 30 ft long for B-70 Air Force bomber components are being planned by North American Aviation Inc., Los Angeles. Some method of air locking will undoubedly be used to limit furnace size.

PURE TUNGSTEN RESEARCH—A new electron beam furnace at the Lewis Research Center, National Aeronautics & Space Administration, Cleveland, will cast 6 in. ingots up to 30 in. long. The Temescal-made furnace will be used to study ultrapure tungsten for space applications.

VANADIUM NOTES—The excellent cold working characteristics of vanadium permit reduction up to 95 per cent without annealing, claims Union Carbide Metals Co., a division of Union Carbide Corp., New York. Most probable uses of strip and foil: Parts for x-ray tubes, and atomic reactors.

STUDY GAS METALS—Interaction of gases and metals is an important phase of metalworking, says Stanford Research Institute, Menlo Park, Calif. It is doing research to determine reaction mechanisms so that gases in metal can be controlled more precisely in a variety of industrial processes.

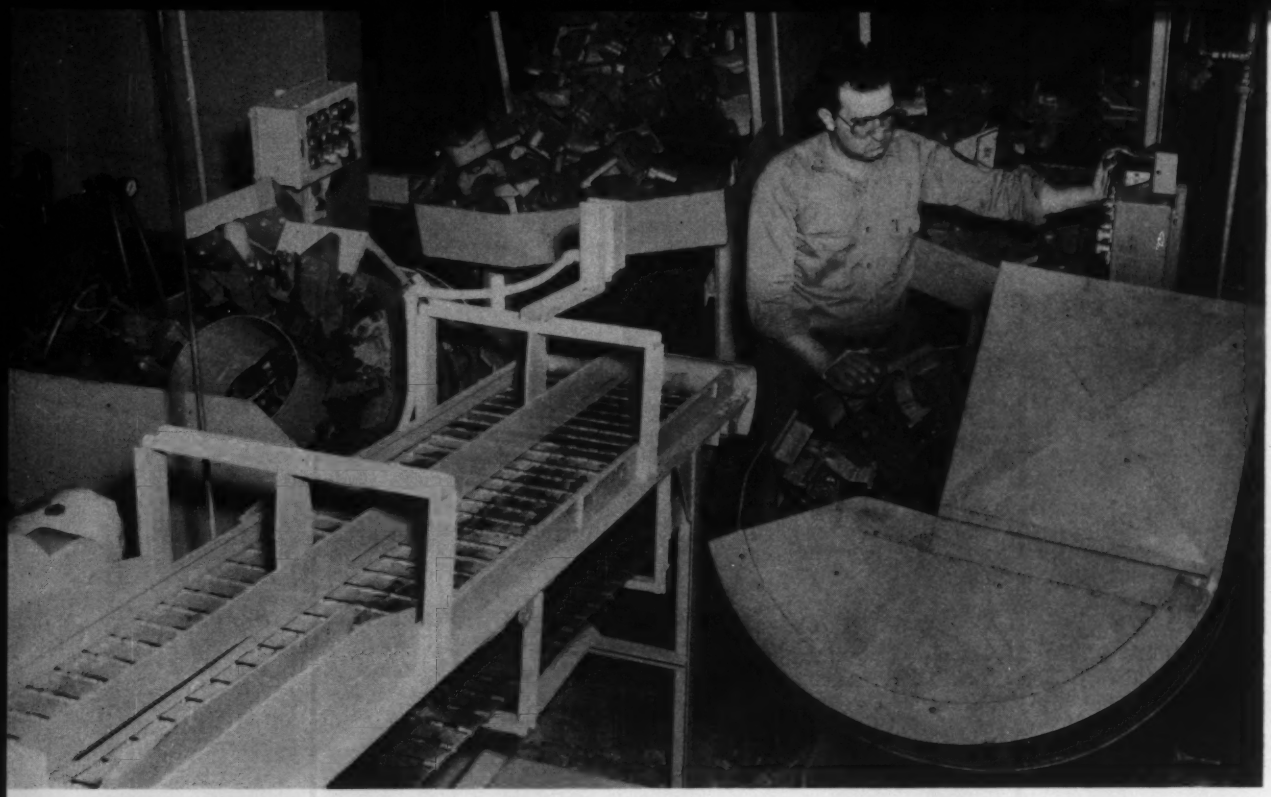
EXPLOSIVE FRONTIERS—Fabrication of laminates, clad metals, or sandwich-type materials should turn out to be a major development area for explosive metalworking, thinks Allan T. Fuller Jr., manager of technical services, National Northern Div., American Potash & Chemical Corp., West Hanover, Mass. Such techniques should prove especially useful in electronics since the method can achieve a metallurgical or exceptionally intimate bonding between dissimilar metals. The method can be applied to parts no larger than a button, Mr. Fuller says.

IMPROVING METAL POWDERS— National Research Corp., Cambridge, Mass., is looking for ways to make ultrafine tantalum, molybdenum, and columbium metal powders. The firm has already produced particles about 1 millionth of an inch in diameter—the metals have comparatively low melting points. Expected benefits: Denser compacts and metal powder parts with improved physical properties.

MEASURES HIGHER TEMPERATURES— A thermocouple made of tungsten and tungsten-rhenium can reliably measure temperatures up to 5072° F, claims Rugby Research Laboratory, A.E.I. Lamp & Lighting Co. Ltd., Leicester, England. It can be used in a vacuum but not in oxidizing or hydrocarbon atmospheres which attack tungsten.

STUDY HI-TEMP METALLIDES— More than 70 top metallurgists recently met at Cleveland to discuss the advantages of beryllides (compounds of beryllium and other metals) in handling high strength, high temperature, and corrosion resistant applications. Such materials have high thermal conductivity, low density, and a high nuclear cross section, claims Brush Beryllium Co., Cleveland, sponsor of the meeting.

MACHINABILITY GUIDE— Joseph Datsko, University of Michigan, Ann Arbor, Mich., will try to find a way to predict the machinability of new or exotic metals by studying their physical properties. Working with a grant from the National Science Foundation, the professor of mechanical engineering is looking for a way to bypass machining tests.



Righthand and lefthand castings are positioned by separate units. Each has individual pushbutton stations, is shielded in operation to contain spray quench

Mechanical Positioner Solves Heat Treating Problem

Castings to be heat treated have a size tolerance 50 per cent greater than the desired spacing to the induction coil. Handling device makes production heat treatment practical

Section shows heat treated area

POSITIONING a casting for induction heating, without the use of machined surfaces for location, is done with a pair of heat treating machines designed for the Chevrolet-Cleveland Div., General Motors Corp., Cleveland. Equipment was designed and built by Tocco Div., Ohio Crankshaft Corp., Cleveland.

The equipment locates the parts on a rotating table (working from the area to be heat treated), checks them for correct position, and carries them through a hardening treatment. Traverse speed is adjusted for uniform heating.

• Casting tolerances can be plus or minus 0.045 in., but the desired spacing between the inductor head and the casting surface to be treated should be about 0.060 in. So the back of the casting can't be used to locate the treating head.

The casting, a spring support used in the 1960 series of Chevrolet and GMC medium and heavy trucks, is made in righthand and lefthand versions. The two types must be kept separate for machining steps, and they are handled in separate units for the heat treatment.

• The heat treated area is on a section which is a compound curve.

The function of the curve is to vary the effective length of the spring with the amount of loading, helping the truck to adjust to light or heavy loads without a great difference in riding characteristics. The hardening operation increases the wear resistance of the bearing area of the spring hanger.

To obtain uniform heating from one part to another, it is important that the spacing between the coil and the part be constant. But there are no positioning pads on the casting at the time it is heat treated; all machining steps follow the heat treating. The most difficult job for the designers at Tocco was to locate the parts for treatment, based on the surface to be heat treated.

• The hardened area extends up each side of the casting, in addition to the main bearing surface.

Specifications call for a depth of hardness of 0.060 to 0.090 in., measured to a hardness of Rockwell Rc 50. The hardened area must continue around the end radius enough to support the spring when it is in the light load position. To obtain the pattern required, the induction coil must not only be the correct distance from the bottom portion of the area to be hardened but also must be centered between the walls so that they are evenly heated.

• Two rotating tables are used, one for the righthand and the other for the lefthand castings.

A single 100 kw generator supplies 10,000 cycle power to both tables; maximum power drawn by either table is 45 kw. One operator loads and unloads both machines.

Each table has nine holding fixtures. The operator places a casting in the first location in approximately the correct position. As the table turns, the casting is pushed up against a group of cam followers, which position it on the proper radius. The operator then tightens a single, spring loaded clamp to fix the work in the plane of the table.

At the next station, the casting is positioned to center it over the work coil. Each supporting fixture is carried on a separate hydraulic cylinder, with oil on both sides of the piston. At the positioning station, a valve connects both sides of the piston, so that the cylinder is free to move. At the same time, a scissors fixture is actuated, coming up against the side walls of the casting; casting and supporting fixture move until centering is complete. Then the hydraulic valve closes, locking the assembly in the correct vertical plane with the table.

The next station has a low voltage contact system which checks to make sure that the casting has been properly positioned. The machine is automatically shut off if there is no casting in position for heat treating, or if it is wrongly positioned.

A similar low voltage probe is used on the heating coil, to prevent possible damage by an out-of-place casting. And another limit switch will cut off the machine if it malfunctions.

• The castings move under the heating heads at a controlled rate; heating is by a scanning process.

Duration of the heating cycle is about 40 seconds. But the rate is not constant; the movement of the table is slower at the ends of the casting to compensate for the greater distance between the head and the part. This provides the necessary uniformity at the ends of the bearing surfaces. Quenching is also continuous; a water spray follows the heating. A small amount of a soluble oil is added to the water to prevent rust formation, but it does not interfere with quenching.

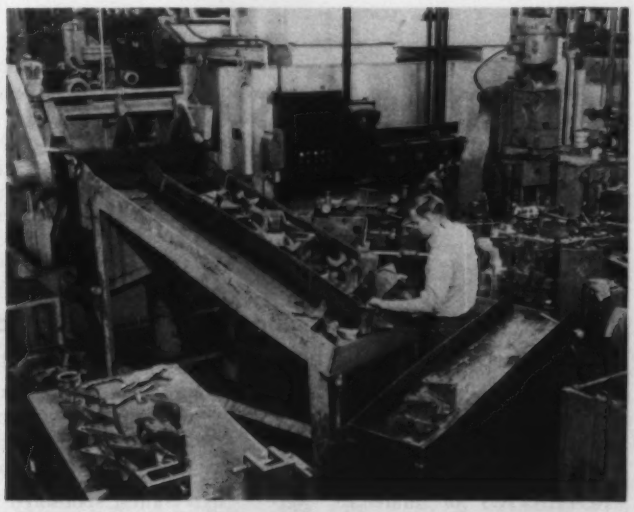
• Tempering and machining follow the hardening step.

As each casting is removed from its fixture after the hardening treatment, it is placed on a conveyor leading to a tempering oven. Here it is heated in forced circulation hot air at 375° F for 60 to 75 minutes. A woven mesh belt supports the work and permits air circulation. Castings drop into a water tank as they leave the tempering oven, to cool them to room temperature.

A conveyor removes the castings from the water, delivering them to the operator of a six station Kingsbury automatic for the machining steps. The same machine is used for righthand and lefthand castings. Final stage: Checking dimensions.

The conveyors consist of parallel tracks, so that the righthand and lefthand castings are kept separate as they move through the heat treating cycles.

Castings in this machine move counterclockwise. Cam followers for setting against curve are at the top



Exiting from the heat treating line, castings are machined, checked for dimensional tolerances as final steps

Contest winner J. W. Beckman designed this heavy axle plate. The malleable part costs 43 per cent less than the one it replaced

Malleable Casters Cash in On Product Redesign

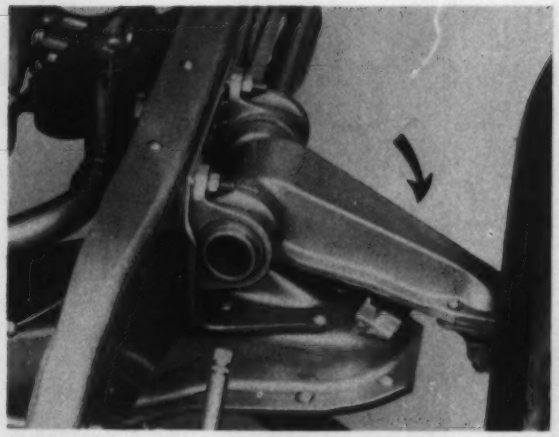
Winners in an industry competition take advantage of the material's properties. They also stressed low cost per piece in long production runs

PROPERTIES of materials were fully exploited by four of the five winners in this year's annual design contest sponsored by Malleable Founders Society, Cleveland. They sold their approach largely on the basis of reduced part cost in production quantities.

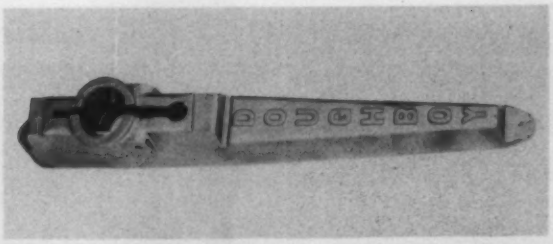
The winning entry, a 94 lb, front axle pivot plate for a giant earth scraper, was submitted by Joe Beckham, Texas Foundries, Lufkin, Tex. The part functions as a bearing plate for a single gooseneck arm which connects the front axle to the main body of the scraper.

The part used to be made in two pieces, then assembled after the cylindrical section was bored. The technique made it difficult to maintain a flat bearing area on the top of the part, adding to its expense and detracting from its appearance.

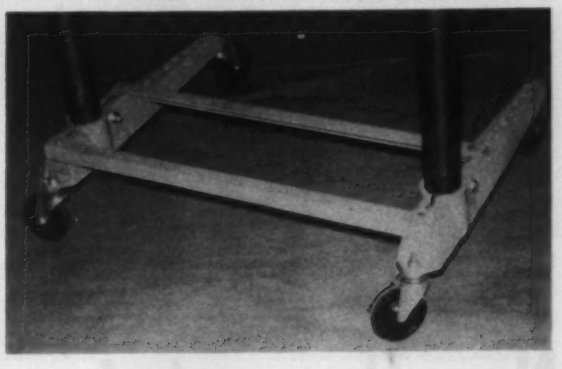
The maker, who was dissatisfied with the tailoring needed to produce the part, accepted the malleable

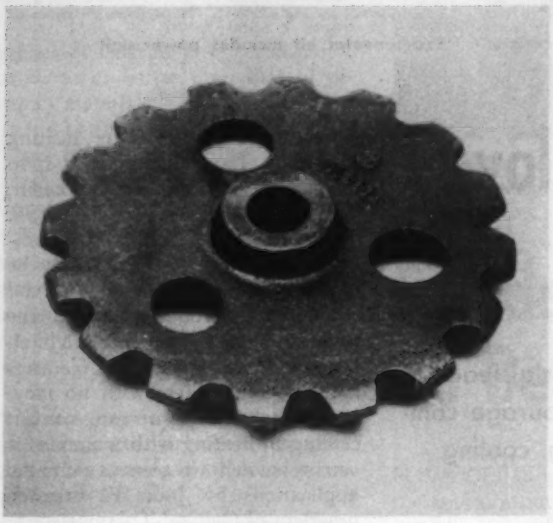


This torsion bar support arm, cast from malleable, has trimmed part costs for a truck manufacturer

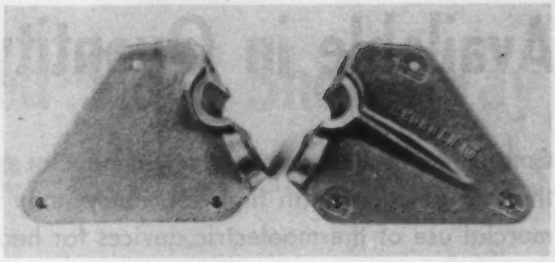


This cast base (above) costs 20 per cent less than its predecessor. It's a base for a cart (below).





This cast sprocket is a new product for one company. It requires neither hardening nor machining



The two piece casting replaces a one piece part. Since the part can be disassembled, replacement is simplified and 20 per cent faster. Halves are separated, then lifted off a through shaft

casting design. The bolt holes are cast instead of drilled; weight is reduced more than 20 per cent; strength is increased because of the one piece design; and the top bearing surface is flat. The user is saving 43 per cent on the cost of the part, about half of which can be attributed to lowered machining costs.

Second award went to Paul Potter of Central Foundry Div., General Motors Corp., Saginaw, Mich. He put pearlitic malleable iron to work as a support arm for a truck torsion bar suspension system. Performance of the part is good, and it costs less to make than the part it replaced.

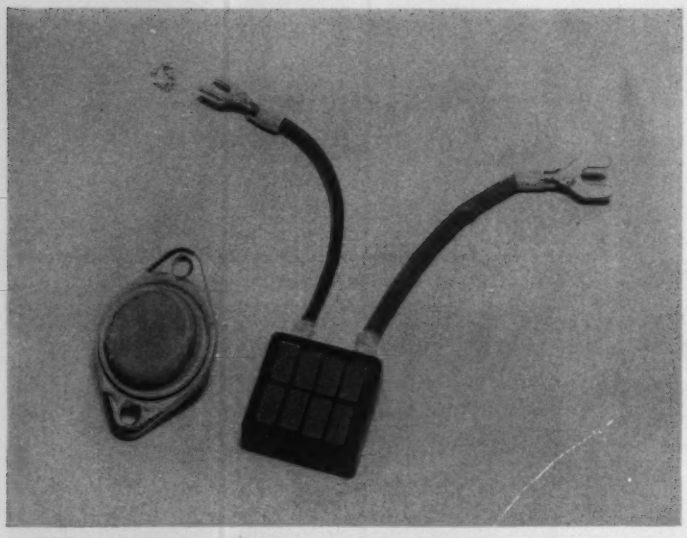
Third place winner, John Entenmann, Northern Malleable Iron Co., St. Paul, Minn., saved the maker of an automatic packaging machine 20 per cent in redesigning a steel leg base to ferritic malleable. The cast base weighs a third less than the former part, is sturdier, and permits the user to have his name cast in the base.

Honorable mention winners were Richard B. Calhan, Dalton Foundries, Warsaw, Ind.; and Richard L. Gutenkunst, Milwaukee Malleable & Gray Iron Works, Milwaukee.

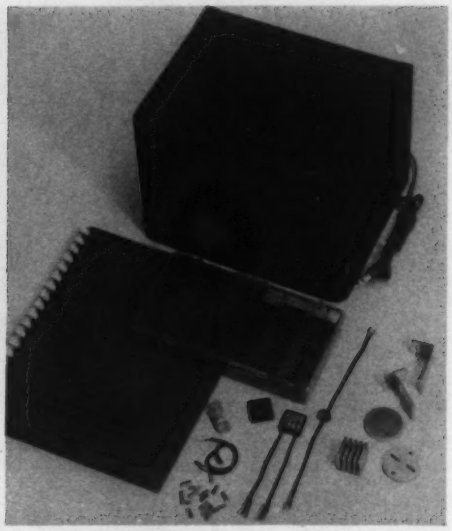
Mr. Calhan's design is a malleable sprocket that opened a new market for his company. The new parts are neither hardened nor machined. In a test program, the part performed so well that the customer authorized two more conversions to malleable sprockets. Savings ranged 12 to 47 per cent on the three converted gears.

Mr. Gutenkunst's entry is a two-piece deflector hub for an agricultural implement. The malleable castings cost 17 cents less than the former part. Also, since the part is under constant shock, breakage and deformation were common. Breakage is down, and replacement is 20 per cent faster because of the two piece design. It used to be necessary to disassemble a complete shaft unit and slip parts off the end of a shaft when a hub failed.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, Ohio.*



Size of an eight thermocouple Frigistor module is similar to a transistor



Experimental kit includes power unit

New Thermoelectric Alloy Available in Quantity

Combining four elements in semiconductor material leads to thermal junctions with high efficiency, may encourage commercial use of thermoelectric devices for heating, cooling

ADD another material to the list of those entered in the thermoelectric sweepstakes. The quaternary alloy of bismuth, tellurium, selenium, and antimony is tradenamed Neelium by General Thermoelectric Corp., Princeton, N. J.

It is said to be among the first high efficiency products available in commercial quantities.

• **Makes Thermocouples**—The alloy is used in the manufacture of bimetallic units called thermocouples. But the major use foreseen (see STEEL, Feb. 29, p.57) is their operation in reverse: Passing a current through the couples generates heat at one junction, cools the other. A group of such couples is used to increase the heating or cooling effect; reversing the direction of the direct current will interchange the heating and cooling junctions.

The company makes a basic, eight-thermocouple module, which it calls a Frigistor. The modules, and the individual thermocouple elements themselves, will be offered; there are no plans to sell the new alloy alone. The eight element Frigistor (dimensions are 1 by 1 by ¼ in.) is sealed in a high impact plastic case. The copper connection bars are also the heat conducting elements and are the only metallic elements exposed. Surfaces are ground and lapped for good mechanical, electrical, and thermal contact. The element is reported to have a heat pumping capacity of as high as 10 to 15 watts.

Variations of the basic unit can use currents as low as 5 amperes at ½ volt.

• **Hot and Cold**—Since a temperature differential is produced, the units can be employed for heating or cooling. Immediate interest is in the cooling of electronic equipment, so that size can be reduced and yet permit operating at safe temperatures. Initial uses will probably be military. Domestic and commercial devices are brought nearer, the company believes, by the high efficiency of its product. Refrigerators and air conditioners with no moving parts and that can convert cooling to heating with a simple reversing switch are seen as potential applications by John F. Brinster, president of General Thermoelectric.

• **Do It Yourself**—For experimental purposes, a kit is being marketed. It includes the eight-element module, a single thermocouple, fin assemblies, a special adhesive, insulating material, suitable power supply, and an instruction booklet. The low voltage power supply will drive one or more of the Frigistor modules.

General Thermoelectric Corp. is a subsidiary of General Devices Inc., Princeton, N. J. and Needco Cooling Semiconductors Ltd., Montreal, Que.

Have you Entered the $1000 Contest?

See Pages 5 and 6.

Expert Spots Prime Areas For Ceramic Tool Growth

IT COSTS 10 cents less per part to rough turn cast iron pulleys with ceramic disposable tools instead of brazed carbide tips. Another plus: The machining rate is two to ten times faster.

The comparisons were pointed up by Dr. A. O. Schmidt, Kearney & Trecker Corp., Milwaukee, who concludes: "It has been demonstrated that for certain turning operations, ceramics are the best tool material."

• Superiority of ceramic tools is more pronounced at high speeds than at low or conventional rates.

"In fact, at lower speeds some grades of carbide give performance equal to or better than that of ceramic materials," Dr. Schmidt told guests at the 24th annual Machine Tool Electrification Forum sponsored by Westinghouse Electric Corp., Pittsburgh.

But at the higher speeds: "Ceramic tools may remove up to four times more volume of metal than carbides in the same length of time with equal tool life in terms of cutting time."

• Although you may be wary about ceramics, particularly for interrupted cuts, they can pay their way on other selected jobs.

In addition to turning and boring many steel alloys, ceramics look good on some special alloy cast irons, probably because of the favorable abrasion resistance of the ceramic.

Dr. Schmidt also reported ceramics have been used successfully in light milling cuts and for finishing cuts on cast iron, steel, and aluminum parts.

Frit Cleared From Air

The problem of removing tiny particles of frit from the plant atmosphere has been solved in some areas at GE's Appliance Park, Louisville. The particles are generated by porcelain enameling operations.

The solution: Wet-inertial dust collectors made by Joy Mfg. Co., Pittsburgh. Dust removal efficiency of the units (adjacent to two rework areas) is estimated to be more than 95 per cent.

Alcoa design engineer holds ¼ in. finned tube 14 ft long which was impact extruded from a new kind of slug made of aluminum powder

Powdered Slugs Show Way To Better Aluminum Impacts

POWDERED unsintered slugs are the key to a new process for impact extruding aluminum just developed by the Aluminum Co. of America.

The method greatly extends the forming range of impact extruded parts which are more intricate and more accurate than those made with conventional slugs, claims A. R. Van Vorst, Alcoa's manager of impact sales. In addition, the parts will withstand higher temperatures than regular aluminum products.

• The process begins with a compressed slug of aluminum powders. Finished parts are said to be serviceable in nuclear reactors and missiles.

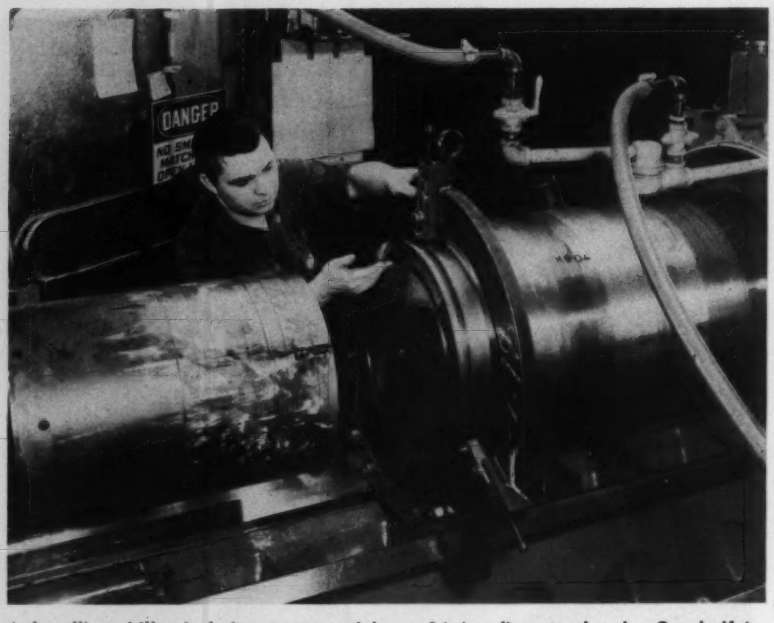
Alcoa says its process can be applied to more parts than were usually handled by its former methods. Maximum and minimum size limits are relatively unchanged. Tolerances can be as close as 0.0025 in., a factor which eliminates much machining.

The high temperature feature of the Alcoa process is related to the metallurgical composition of the powders, not the chemistry, states Mr. Van Vorst. Since the powders aren't sintered, the oxide coating around each particle is evenly distributed throughout the final part, adding to its temperature characteristics. Cross sections show that parts resemble solid forgings.

So far, the method has shown considerable savings in finished piece price, claims Mr. Van Vorst. Less machining is probably one factor.

• Alcoa is one of the big impact producers. It confines itself to the larger, hard to handle pieces.

Annual output at Alcoa averages something over 10 million lb of impacts which are used mainly for aircraft, missiles, and nuclear reactor work. Current production pieces range 5 to 30 lb, and up to 8 in. diameter.



A beryllium billet is being trepanned by a 16 in. diameter head. One-half is done from each direction. Oil is used to flush the chips out of the hole

Trepanning of Beryllium Speeded by New Lathe

It also eliminates chatter problems and tooling alignment difficulties. Cylinders produced are for atomic energy, defense system, and missile applications

SINTERED beryllium billets are being trepanned at higher speeds (26 rpm vs. 16 before) by a new lathe at Brush Beryllium Co., Cleveland. The lathe (a Warner & Swasey 4A, M-3550) replaces a 1941 Model 4A. The new machine eliminates chatter problems and tooling alignment difficulties.

• **Part**—The part is about 38 in. long and 20 7/8 in. in diameter. In the rough, it weighs 875 to 900 lb. The cylinder produced from the billet weighs about 200 lb when it leaves the machine, and the solid core removed by trepanning weighs about 400 lb. The core is saved for the production of other parts.

• **Tooling**—The part is held in a 24 in., three jaw chuck and supported at the other end by a special, closed type steady rest. Tooling includes a large single cutter trepan head (16 in. in diameter), a short core drill for spot facing, a center drill, and a revolving center.

In addition to hexagon turret tooling, cutters for turning, grooving, and facing are held in the square turret.

• **Operation**—The first step is to spot face, to assure a clean start for the center drill. Other steps: Center drill (to support the part during grooving and turning); turn part of the outside diameter; groove to start trepan head (groove from square turret); place steady rest and trepan about half way through part; and face.

After those steps are completed, the part is reversed in the chuck, and the operation is repeated from the other side.

• **Cutters**—With the exception of the high speed steel center drill, most of the cutters are premium grade carbide. Beryllium is highly abrasive and rapidly erodes the cutting edge even on the harder carbides.

Brush changes cutters in the trepan head at the beginning of each cut (two cutters per piece). Because of short tool life, triangular, insert type carbide tips are used (when possible) for turning and facing to get the benefit of six cutting edges per tip. Kendex holders are used. The cutters have a negative rake with mechanical chip breakers. Except for the trepan operation where oil is used to flush chips out of the hole, machining is done dry, the company reports.

• **Chip Handling** — The chips (worth $44 a pound clean and dry) are recovered from the point of separation from the work. Where possible, special pickups are designed for each tool to direct the chips into the vacuum salvage system. Flexible tubes carry the chips from the tool into the salvage barrels.

Chips are segregated into three types:

1. Clean, dry ones that can be recycled.
2. Roughing chips (from the outer surface and having a high oxide content).
3. Chips salvaged from oil or other coolant materials. The chips contaminated by oxides and oil must be fully reprocessed from the beginning of the beryllium production cycle.

• **Safety** — To prevent dangerous concentrations of beryllium dust, the vacuum system pulls the dust into salvage collectors.

Employees are instructed to change into company furnished clothes on the way into the plant and shower before leaving.

Other precautions that are taken by the company include a weekly check of lung capacity and a physical examination every six months.

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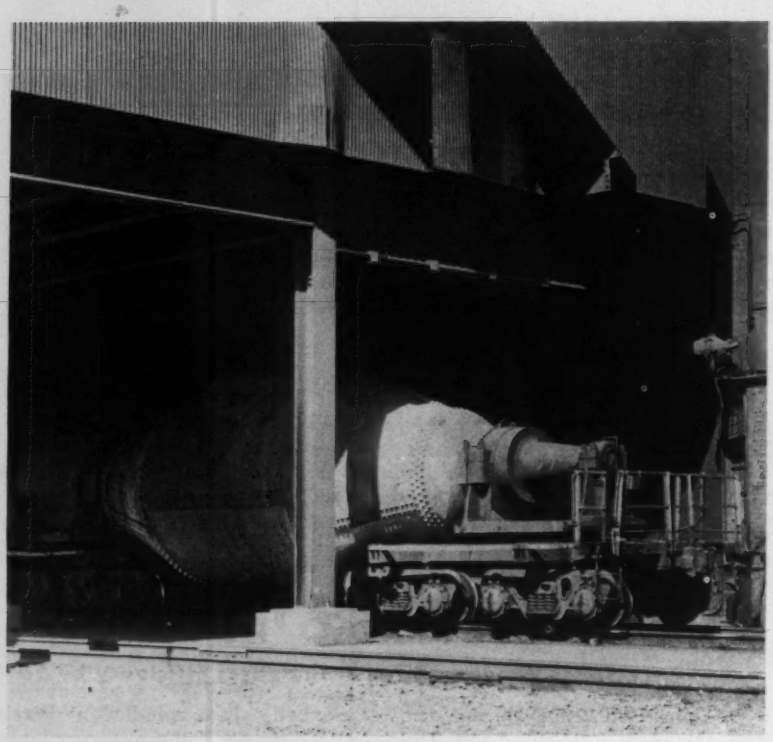
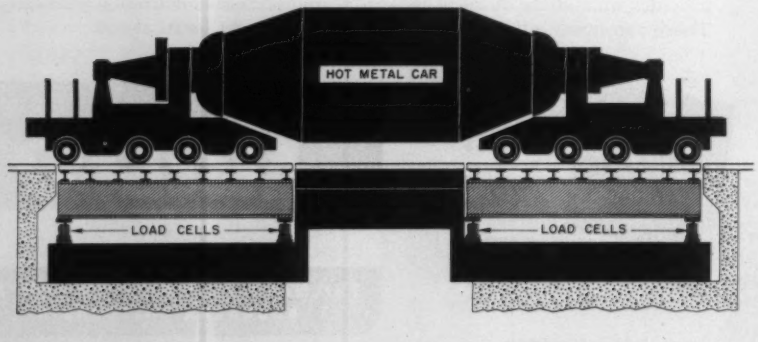
Electronic Scale Systems Weigh Open Hearth Charge

Hot metal on its way to the charging floor is measured continuously as it pours from the ladle car; charging boxes are weighed as pan cars travel to the furnaces



Ladle cars standing on the hot metal scales (above) are ready to deliver iron when it is needed on the charging floor. Signals from load cells under floating track sections (below) are translated into weight in pounds in the weighhouse



ACCURATE MEASUREMENT of hot metal, scrap, and other charge materials is made by electronic weighing systems in the No. 3 open hearth shop at Indiana Harbor Works, Inland Steel Co., East Chicago, Ind.

Electric signals from weight sensing elements under floating sections of hot metal and pan car tracks are translated into weights in pounds.

• Strain gages, bonded to steel support columns, measure compression caused by car weight.

Four, hermetically sealed load cells support each weighing platform. Strain gages (electrical resistance elements) attached to the central column of each cell are distorted as the column is compressed. That changes their resistance value; the total resistance change in all four load cells is read out in pounds on a dial, or recorded on weigh tickets by a printout mechanism.

The systems are simple in design and extremely accurate, says C. F. Kirkland, primary products engineer. They are inexpensive and require little maintenance. Another reason Inland chose load cell weighing: The previous hot metal weighing station accommodated only one ladle car, and the company needed room for two. A conventional weigh station would have required extensive excavation, which wasn't convenient with the plant's low elevation above the lake level. The electronic system required a minimum of excavation.

• The company reports long service life from the load cell and bearing assemblies.

Early in 1957, while the hot metal weigh station was being rebuilt, a temporary scale was set up in the ladle repair pits. Each ladle of hot metal was weighed before it was taken by crane to the charging floor.

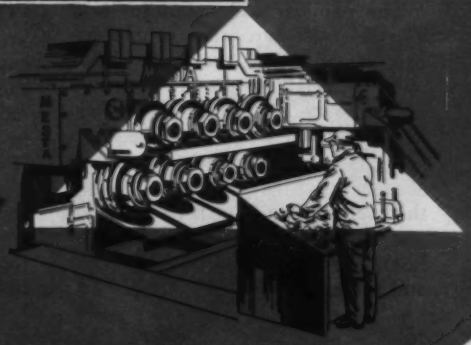
When the permanent stations were completed, load cell and bearing assemblies were taken from the temporary scale and installed in the new system. The original cell and bearing units are still in service.

The load cells aren't recommended for use at temperatures above 150° F. That doesn't present any problems at the hot metal weigh station, where the cells are well

WIDE FLANGE BEAM and STRUCTURAL MILLS

Designed and Built by MESTA

Rolling Wide Flange Beams in the 40" Finishing Mill Stand on the MESTA Universal Structural Mill at Inland Steel Company



Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA

ventilated and shielded. But temperatures equal or exceed the recommended maximum on the charging floor. Pan car load cells are near the furnace checker chambers. Cooling water is circulated around the cells in copper coils, keeping the units at a safe temperature.

• Submarine ladle cars are weighed as they are tilted to discharge hot metal.

The company uses 100 and 200 ton hot metal cars. Weigh stations are designed to accommodate both sizes. Depressions ground into the rails help spot the cars for weighing and unloading and keep them from drifting.

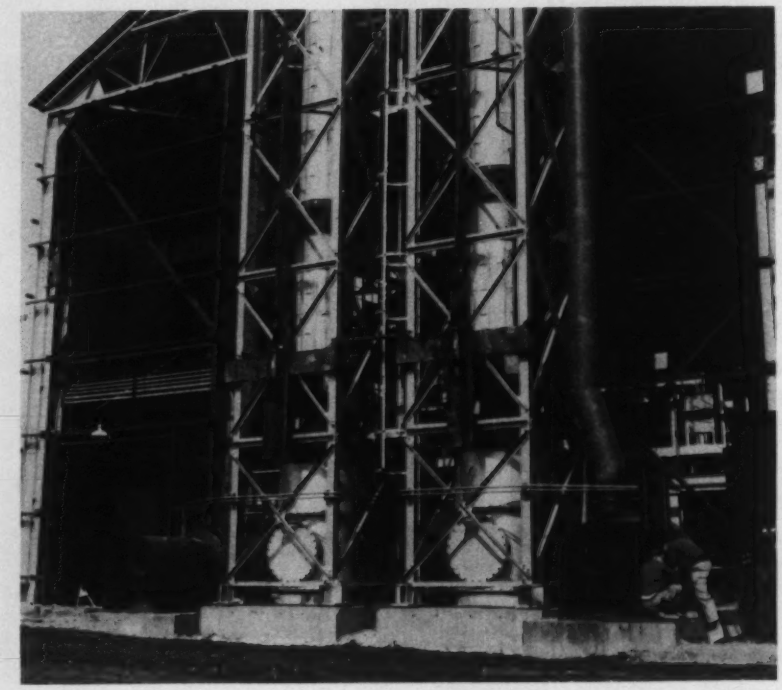
Gross weight of the car is noted on the weigh ticket. A control panel inside the station permits the weighmaster to tilt the car and pour hot metal into the charging ladle. As molten metal drains from the car, the weight reduction is registered continuously on the scale meter. A cursor, mounted on a ring at the periphery of the dial, helps the weighmaster stop metal flow at a predetermined weight by reversing the tilt control.

The new gross weight of the car and the weight of the metal withdrawn are noted on a weigh ticket.

• Charging boxes loaded with lime, scrap, or other material are weighed as pan cars are moved toward the furnace.

The pan car train moves past the weighhouse at 1½ to 1¾ mph; the weighmaster writes the number of each car on a ticket that already tells what commodity is carried. A recording device prints out the net weight. The dial is usually set to zero with a carload of empty boxes on the platform. An average tare weight is assumed, unless a heat of steel is being made to extremely close specifications.

The pan car scale platform is 2 in. shorter than the coupler-to-coupler length of the cars. That prevents weighing of more than two axles at once. Time delay switches, tripped by levers at track level, keep the cars on a prescribed time cycle as they reach the platform. When the weight of a car isn't recorded (because the train was moving too fast), the train must be backed up and the car reweighed.



Combustion air is pumped through a jacket built around the waste gas exhaust

Alloy Steel Recuperators Preheat Soaking Pit Air

NEW SOAKING PITS and metal recuperators that supply them with preheated combustion air are in operation at the West Virginia Works, Connors Steel Div., H. K. Porter Company Inc., Huntington, W. Va.

Pits and recuperators are part of a $1.6 million expansion program expected to double steelmaking capacity at the plant and provide greater operating flexibility.

• The recuperators are said to offer longer life than conventional units and require minimum maintenance.

Called Escher recuperators for their inventor, Hans Escher, a Swiss-born engineer, the units were installed by Rust Furnace Co., Pittsburgh. Escher recuperators have been widely used in European mills since World War II but have been marketed in the U. S. only recently.

Towers are mounted over the waste gas system; waste gas enters the inner shell of the tower at its base and travels upward. Cold combustion air is pumped to the top of the tower and forced through a bustle into the annulus between the inner and outer shells. As the air moves downward, it is heated to 1000° F by waste gases at 1750° F.

The two units are fabricated from alloy steel plates and standard steel shapes. They should function up to ten years at near peak efficiency without major maintenance because of their simple design and metal construction, officials of Rust Furnace say.

• The two new soaking pits will take over part of the work now handled by several older units.

The pits are single fired; each has a 100 ton ingot capacity. They are lined with plastic refractory materials supplied by Porter's Refractories Div.

The plastic material is said to offer greater abrasion resistance than the materials ordinarily used, and it is extremely easy to repair.

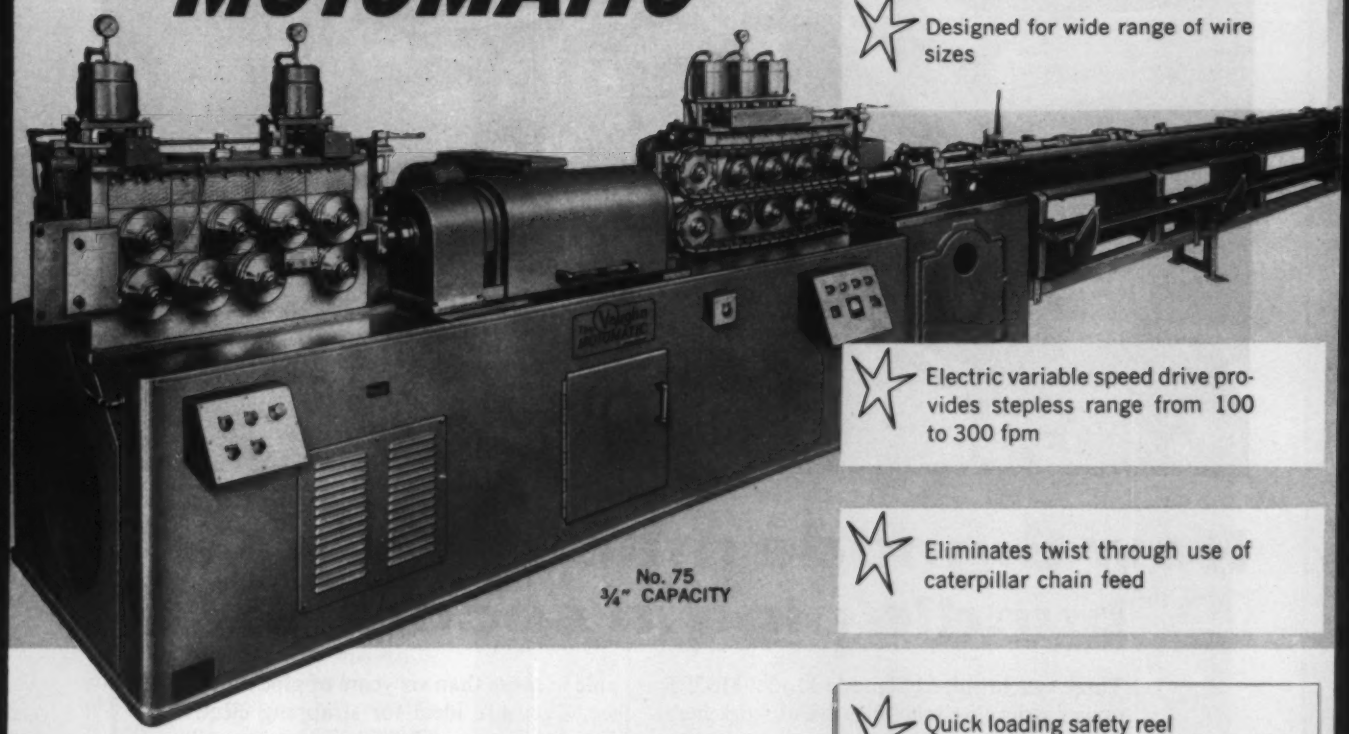
EVERY FEATURE

for the volume processing and uniform cutting of

STRAIGHT WIRE

up to 300 feet per minute!

The Vaughn® MOTOMATIC



- Delivers uniform diameter bars and precision-cut lengths
- Designed for wide range of wire sizes
- Electric variable speed drive provides stepless range from 100 to 300 fpm
- Eliminates twist through use of caterpillar chain feed

This efficient Vaughn machine affords automatic production of straight, cut lengths direct from the coil, processing the entire coil from end-to-end, and reducing scrap to an absolute minimum. Built to high Vaughn standards of smooth operation, low maintenance and long service life, the Motomatic increases production while reducing labor time and fatigue—a dividend-paying investment year after year. • Send for Motomatic Bulletin No. 751.

The VAUGHN MACHINERY COMPANY
CUYAHOGA FALLS, OHIO, U.S.A.

COMPLETE COLD DRAWING EQUIPMENT . . .
Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

- Quick loading safety reel
  –facilitates starting wire coils into machine and protects operator from revolving payoff coil. Holds two or more coils.

Courtesy of Blaw-Knox Company, Aetna-Standard Division

New Signode machines bundle pipe in seconds

Three synchronized Signode Model MS2BR power strapping machines are at work here. They automatically apply three straps per bundle. With these machines, it is now possible to keep ahead of the production of high speed pipe mills. Uniformly tight bundles are produced.

Similar Signode power strapping machines for pipe bundling have been proved dependable in more than six years of pipe mill service. They are ideal for strapping electrical metallic tubing and rigid conduit, as well as pipe. Write for more information about these machines or this installation. Signode counsel is available to help you work out a strapping installation that meets your requirements, no matter what your product. No obligation. Just write:

First in steel strapping

SIGNODE STEEL STRAPPING CO.

2645 N. Western Avenue, Chicago 47, Illinois

Offices Coast to Coast. Foreign Subsidiaries and Distributors World-Wide
In Canada: Canadian Steel Strapping Co., Ltd., Montreal • Toronto

More Than 100 Firms Doing High Energy Forming

MORE THAN 100 FIRMS are active in explosive, hydroelectric, or electromagnetic forming, STEEL learned at the fourteenth New Eng- Institute of Metallurgical, Mining, & Petroleum Engineers in Boston.

• Many examples of shortcuts via explosive methods were cited.

Dr. J. S. Rinehart, Colorado School of Mines, Golden, Colo., said that his school needed a die to impress a seal on its diplomas. The die was turned out in less than a day by embossing the design in a heavy steel plate with an explosive. Conventional engraving would have taken eight weeks, including delivery time, he said.

Another expert said his firm has joined nickel linings to seamless tubing metallurgically with explosives. You can also recover the worn-out linings with variations of the same method.

A panel agreed that a hypothetical job (splitting an 8 in. square ingot 24 in. long) could be solved explosively. Chances are a lengthwise cut would be smooth and vary less than $\frac{1}{8}$ in. from a selected cutting line.

Many experts reported problems in physical metallurgy which had to be answered before long strides could be made in practical applications. In addition, not enough is known about the interaction of explosives with metals. For example, is was stated that a hand grenade contains 1500 times too much explosive for the job. Research into the action of the explosive on metals could do much to lower that ratio (and incidentally benefit those interested in forming and cutting metals).

• Convair Div., General Dynamics Corp., Ft. Worth, Tex., has been working with hydroelectric forming for nearly 2½ years.

Here's a report by Warren Fedderson, chief of manufacturing research and development: The method can be used indoors, and it is repeatable. Where a single operation is involved, it still is not as cheap as regular press work, but it will do work on metals impossible to handle by conventional methods.

Convair has developed a machine which explodes a titanium wire electrically to produce the shock wave. A bank of condensers (about 1200 microfarads) stores the electricity at 6000 to 12,000 volts. It regularly turns out preformed hollow bodies, cups, channels. Main interest is in expanding and cutting oddly shaped tubes, says Mr. Fedderson. Contrary to some opinions expressed, cast epoxy dies have worked well for Convair.

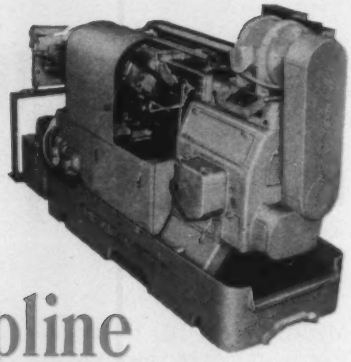
• Electromagnetic forming is still in the experimental stage, but it appears to have much promise in certain areas.

Convair uses the same equipment for electromagnetic and hydroelectric forming. The secret of concentrating enough magnetism is coil design (needed: 500,000 gauss). So far, most coils have been potted in a tough epoxy.

Convair engineers have achieved 13,000 to 14,000 ft lb in a 2 in. circle. New coils must be made for each job.

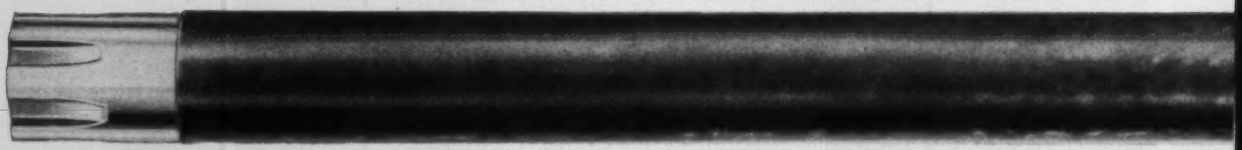
"There is no limit to the size of electromagnetic forming equipment except the size of your courage," explains Mr. Fedderson. High voltages would require exotic setups with extensive arc-over protection.

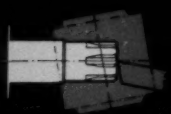
BLAST FURNACE BELL OVERLAID WITH 3200 LB OF STAINLESS beading solved a critical surface wear problem for U. S. Steel at its Geneva Works, Provo, Utah. The firm's engineering and maintenance crew developed the welding technique of putting down three layers of stainless beading to resist abrasion, corrosion, and extreme temperature changes. Bell is 15 ft in diameter and weighs more than 30 tons



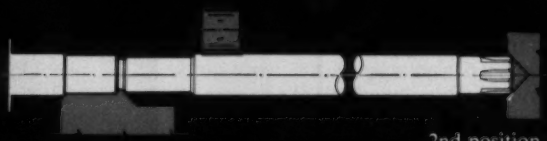
Acme-Gridley performs spline hobbing in a single set-up . . .

slashes ringer roll shaft production time 63%!



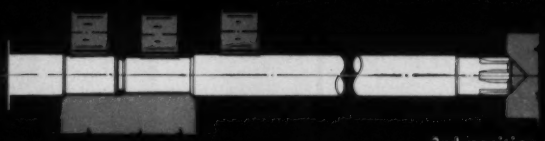


5th position
Hob Spline—Face Front (spindle clutch disengaged, spindle driven from hobbing attachment)

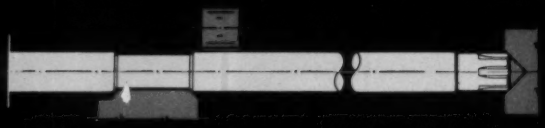


2nd position
Form Spline Dia. of Next Piece and Breakdown for Cut-off—Support

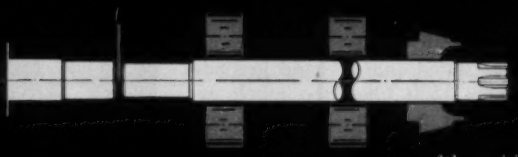
6th position
Feed Stock



3rd position
Shave Rear Dia. and Spline Dia.—Support



1st position
Form Rear Dia. Past Cut-off—Support



4th position
Support—Pick-up—Cut-off

6 Operations in 27.9 Seconds

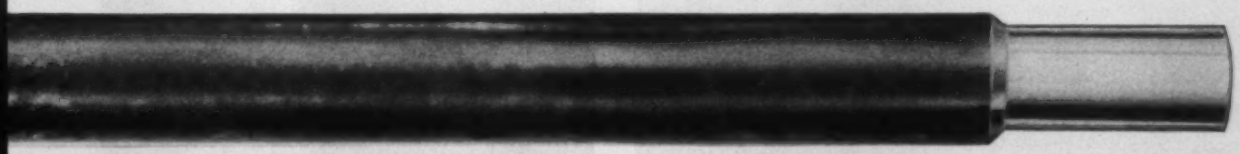
Here's how imaginative National Acme solutions to tough machining problems extend total machine capability and pay off in *tangible* production savings.

Spline hobbing is generally considered beyond automatic bar machine capability. Yet, an ingenious National Acme hobbing attachment . . . installed on an Acme-Gridley 1¼" RA-6 with modifications . . . lets a well-known manufacturer of ringer roll shafts do spline hobbing in the primary set-up; has cut per-piece production time 63%. In addition, a unique automatic feeding arrangement has drastically reduced stock-loading downtime.

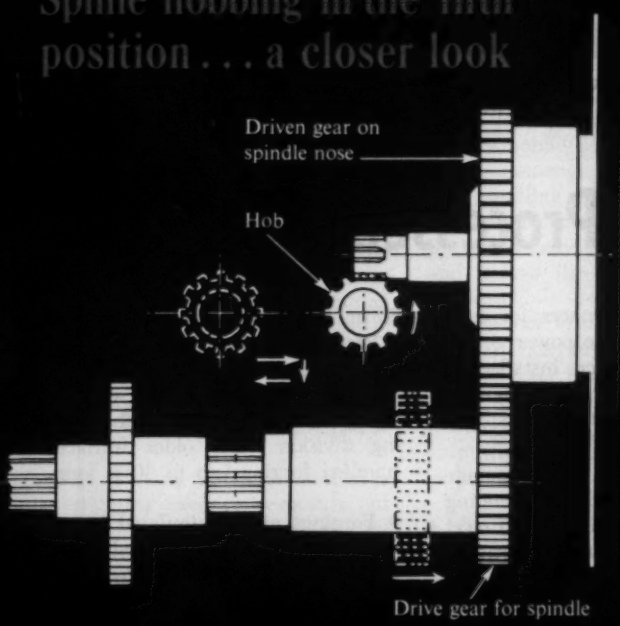
Special attachments like the spline hobber, plus such standard features as direct camming, independently operated toolslides, and a wide open tooling zone are the reason Acme-Gridley capability is limited by imagination only. No wonder cost-conscious manufacturers everywhere depend on Acme-Gridleys for higher mass production efficiency at lower cost. Detailed information on the world's most complete line of multiple and single-spindle automatic bar and chucking machines is yours for the asking. Call, write or wire.

National Acme's "Zone of Responsibility" includes all phases of cost reduction. Check YOURS . . . Then Check National Acme

Direct Costs: these include direct dollar savings as realized by thousands of manufacturers . . . an "everyday" job for Acme-Gridleys. **Indirect Costs:** effecting important savings in maintenance, downtime, scrap reduction, tool costs, etc. **Product Redesign:** teaming with your design group to take full advantage of Acme-Gridley's cost reducing capabilities. **Direct Material Costs:** our engineers provide important savings in this area by constantly matching machines and tools to modern metallurgical problems. **Make-or-Buy Reviews:** in many cases our Contract Division can assume your production headaches and relieve you of immediate capital investment. **Spot Modernization:** pioneering in modern tooling methods, and the flexibility of Acme-Gridleys can provide many "on-the-spot" savings.



Spline hobbing in the fifth position . . . a closer look



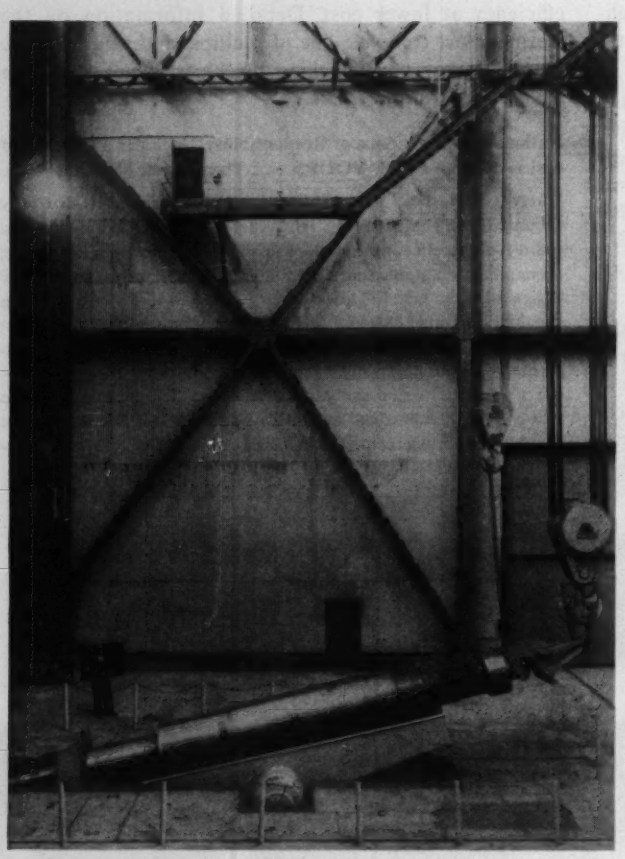
When the hobbing attachment advances, a gear on the attachment engages a gear on the spindle nose and drives the spindle at the required speed for hobbing.

MMT=PE MODERN MACHINE TOOLS PRODUCTION EFFICIENCY

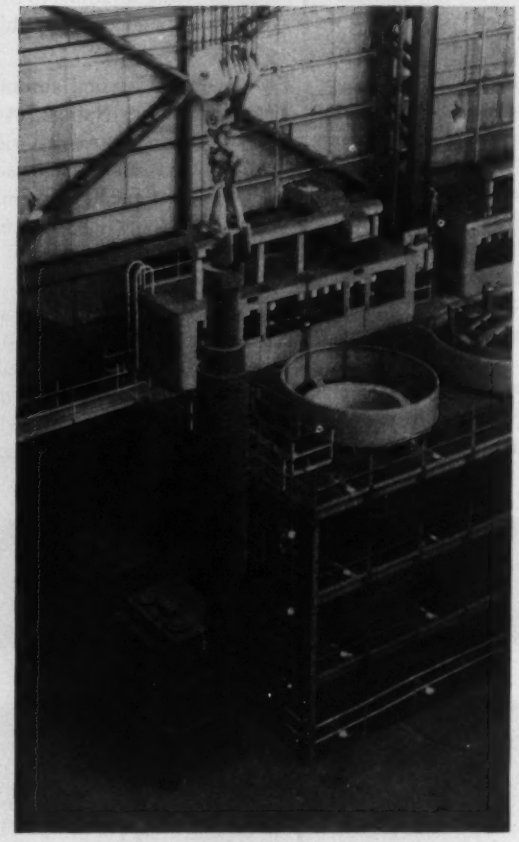
National Acme

THE NATIONAL ACME COMPANY
189 E. 131st STREET
CLEVELAND 8, OHIO

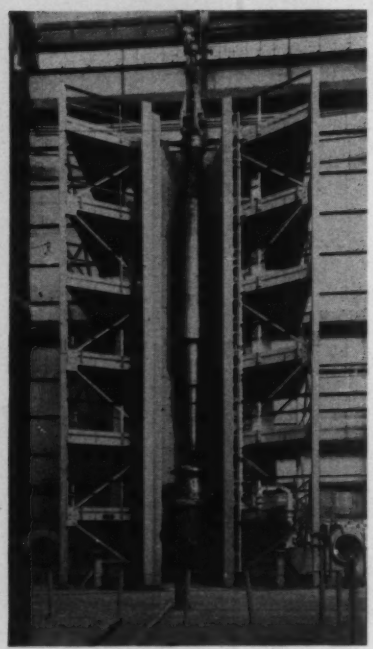
Sales Offices: Newark 2, N. J., Chicago 6, Ill., Detroit 27, Mich.



1. Rotor is placed on the upender, which is tilted to put the part in a vertical position for lowering into the furnace



2. Part is lifted from one of the vertical furnaces after heat treating and taken away for cooling



3. Quench tower turntable spins parts in a spray of air or water

Rotors Processed Upright

SEVEN vertical furnaces for heat treating hefty electric power generator shafts have been installed in the forging division at Homestead District Works, United States Steel Corp., Homestead, Pa.

The new facilities, which include a quench tower and an upending cradle, were built primarily to meet a growing demand in the electrical industry for rotors heat treated in a vertical position after forging and machining, says Robert A. McClure, general superintendent at Homestead.

• The heat treating units are almost half underground.

The furnaces, housed in a modern, 100 ft high structure, sit 35 ft below ground and rise 50 ft above the floor. They can handle rotors and generator shafts 40 ft long and 60 in. in diameter.

Previously, only three vertical heat treating furnaces and a quench tower were operated at the works—in the No. 2 press shop of the forging division. The older furnaces handled forgings up to 30 ft long.

• Forgings are manipulated by an upending cradle and rotated while they are in the quench tower.

An upending cradle, developed at Homestead Works, seesaws on a centered axis to raise forgings into position for heat treating, protecting the parts from bending. An overhead crane carries forgings to the furnaces.

Forgings are placed on a turntable inside the quench tower and spun in air or water jets until they are cooled to the prescribed temperature.

Special Purpose Machine Welds and Assembles

A combined assembly and welding machine designed and built by United Welders Inc., Bay City, Mich., can produce 900 automobile oil filter cartridges per hour with one operator.

The machine consists of two, independently controlled, straight line units joined by a storage conveyor. Partial assemblies are mechanically transferred to each station, and parts are added from hoppers or magazines.

To insure complete assemblies, sensing units monitor the process at key stations. The operator manually inserts two parts in an otherwise automatic assembly.

The first machine assembles and welds three components: Mounting plate, pilot for a fitting nut, and an upper gasket retainer. The assembled unit continues to storage.

The subassembly is then fed into the second machine and other elements are added: Lower gasket retainer, gasket, inner filter element, spring, and outer shell. The inner filter element and spring are the only parts that are manually inserted. The operator has five mechanically idle stations to do this operation.

In projection welding stations, the spring loaded electrodes are of low inertia design to permit followup during the weld. The firm claims that sound welds can be obtained consistently.

Seeks Corrosion Examples

The Welding Research Council is investigating service exposure of Type 316L stainless steel in the as-welded condition. With few exceptions, the limited information available does not permit prediction of service life.

The WRC High Alloys Subcommittee, 1500 S. 50th St., Philadelphia 43, Pa., is seeking examples in which the alloy has been attacked by weld corrosion, plus information on the service conditions.

Results of the survey should help engineers and metallurgists in determining the best material for given applications.

Electronics becomes the engineer as . . .

Signal Drives Trains

ELECTRONICALLY guided trains move parts through the warehouse at Oldsmobile Div., General Motors Corp., Lansing, Mich. The material handling trains follow copper signal wires recessed in the aisles. Driver-operated fork lift trucks load and unload the trailers.

Oldsmobile has six tractors with 150 trailers operating in its warehouse. They're built by Barrett-Cravens Co., Northbrook, Ill.

The GM division reports that the tractors travel at 2 to 3 mph. Maximum trainload is 16,000 lb—4000 lb per trailer.

• **The Guidance**—A No. 12 copper wire is recessed in the aisleways. It's energized during working hours and sends forth a radio frequency signal that's picked up by a sensing device on the tractor. The signal keeps the train on course and prevents it from varying more than ½ in. either way.

Any worker at loading or unloading points can act as a train dispatcher. He simply sets two dials on the tractor control panel. The trains move on preset routes. They stop at intersections to let other trains cross. Each tractor has an electronically controlled bumper bar that automatically causes the train to stop if the bar touches any object weighing 2 lb or more. Revolving red flashers on the tractors act as warning devices.

Dispatchers can preset the controls for any of 21 stations in the system. The trucks proceed to the designated station by the shortest available route and stop automatically until they're loaded or unloaded. They then start off for the next preset stop. The system is flexible, and Oldsmobile says it can be changed. New wires for additional routes can be integrated into the system and more stations added if necessary.

Tractors are operated by 24 volt batteries which are recharged on the night shift.

Here's the setup: At the end of the working day, a punched button actuates an electronic recall and all trains move to the recharging station and assemble in line so they can be plugged into the chargers.

The electronically operated tractor can also be manually operated anywhere within the plant.

Copper Alloy Bulletin

BRIDGEPORT BRASS COMPANY

new BRIDGEPORT NIRONZE® 635 gives 90,000 psi yield strength

90,000 psi Yield Strength Obtained with New Age-Hardenable Copper-Nickel-Silicon Alloy

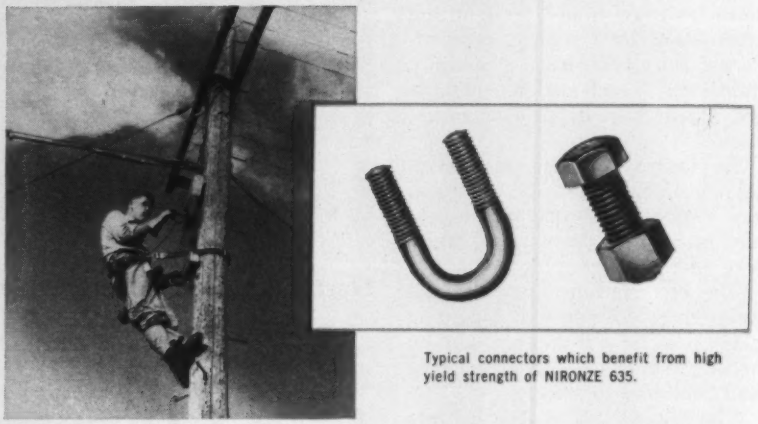
Bridgeport Nironze 635, an age-hardenable copper-nickel-silicon alloy, combines excellent cold-working properties with high tensile and very high yield strengths, good electrical conductivity, excellent general and stress-corrosion resistance. Supplied in the solution-treated and drawn condition, Nironze 635 offers exceptional cold-working properties. A low-temperature heat treatment, following additional cold-work age, hardens this alloy to produce tensile strengths of 100,000 psi, yield strengths of 85,000 psi and improved electrical conductivity of a minimum of 35% IACS.

Easily Cold-Formed . . . Machined

The excellent cold-working properties of Nironze 635 in the *solution-treated and drawn* condition allow such severe cold work as upsetting, cold-heading, roll-threading, bending, forming or similar operations to be carried out with ease. Heat treatment following this cold-work age-hardens this alloy to produce maximum tensile and yield strengths.

Nironze 635 in the *solution-treated-drawn-aged* condition has a machinability about 30% of free-cutting brass rod, thereby making it possible to carry out such conventional machining operations as sawing, grinding, turning, milling or similar operations.

Maximum cold-work may be performed on Nironze 635 in the *solution-treated* or soft condition. In order to obtain highest possible physical properties, this alloy must be cold-worked from 50-80% before aging.



Typical connectors which benefit from high yield strength of NIRONZE 635.

Proved by Performance in These Applications

Cold-headed bolts and fasteners used in pole line hardware, switch gear, wire connectors, neon signs, railway equipment, exposed electrical parts and structural supports, marine hardware and fittings can all use Nironze 635 to advantage. The new alloy's unique combination of high yield and tensile strengths, good conductivity and high corrosion resistance provides design and production advantages never before offered by a silicon bronze.

Test a Sample Now

Nironze 635 has been thoroughly evaluated in the laboratory and in the field to insure the high quality and top performance common to all Bridgeport alloys. To get your test samples and full technical information, call your nearest Bridgeport Sales Office. Or write us direct. Dept. 3905.

Nironze 635 is presently available as rod or wire, supplied in the solution-treated, solution-treated and drawn, and solution-treated, drawn and aged.

NIRONZE PHYSICAL PROPERTIES

Density	0.320 lb/in.³
Color Red	similar to copper
Thermal Expansion	8.9 x 10⁻⁶/°F
Melting Point	1990°F
Nominal Composition:	
Copper	97.5%
Nickel	1.9%
Silicon	0.6%
Total	100.0%
Electrical Conductivity, % IACS	
Cold-drawn and aged	30%
Cold-drawn	15%

MECHANICAL PROPERTIES (Nominal)

Form	Condition	Tensile Strength psi	Yield Strength psi	Elongation % (4D)	Contraction of Area %	Rockwell B Hardness	0/0 IACS
Rod and Wire	Solution-Treated	40,000	12,000	50	90	7	24
	Solution-Treated, Aged	88,000	70,000	12	20	86	43
	S.T. Drawn 50%	65,000	62,000	18	87	67	22
	S.T. Drawn 50%, Aged	100,000	90,000	12	25	95	42
	S.T. Drawn 80%	70,000	65,000	15	85	73	22
	S.T. Drawn 80%, Aged	103,000	97,000	17	62	96	39

COMPARATIVE RATINGS OF NIRONZE 635 vs STANDARD SILICON BRONZES

	Physical Properties			Fabrication Properties			Mechanical Properties		
	Electrical Conductivity (Annealed) % IACS	Melting Point Liquidus °F	Density lb/in.³	Cold Workability	Machinability Rating %	Annealing Temp. °F	Tensile Strength psi	Yield Strength psi	Rockwell B Hardness
NIRONZE 635	*35	1990	0.320	Excellent	*30	**850-900	100,000	85,000	95
High Silicon Bronze (A)	7	1880	0.308	Excellent	30	900-1300	108,000	60,000	95
Low Silicon Bronze (B)	9	1940	0.316	Excellent	30	900-1250	90,000	67,000	90

The term "Nironze" is a registered trade-mark of the Bridgeport Brass Company

*Drawn and aged **Aging temperature

BRIDGEPORT BRASS COMPANY

Bridgeport 2, Connecticut • Sales Offices in Principal Cities

Specialists in Metals from Aluminum to Zirconium

Rotary Surface Grinder Has Power Spindle Tilting

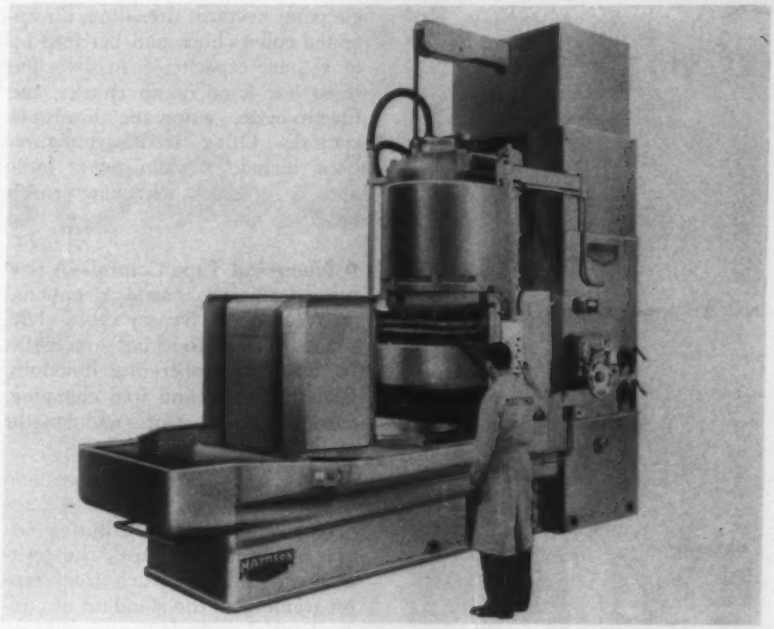
YOU can rough and finish grind extra large parts on the Quick-Tilt, vertical, rotary surface grinder. The machine has a 60 to 72 in. magnetic chuck and has enough mass to apply 125 hp through the spindle.

The unit can machine parts with a hogging cut to within a few thousands of final size (grinding with the leading edge of the wheel to increase grain penetration) and then finish grind in the same setup.

The slight concavity is quickly removed in finish grinding. A selector switch and an air cylinder actuate the spindle tilting mechanism and return the wheel to dead flat position.

Downfeed is continuous from 0.005 to 0.165 in. per minute. A predetermined stop disengages it when desired size is reached.

For further information, *write* Mattison Machine Works, 200 Blackhawk Park Ave., Rockford, Ill.



Electrolytic Grinder Handles Medium Volume Work

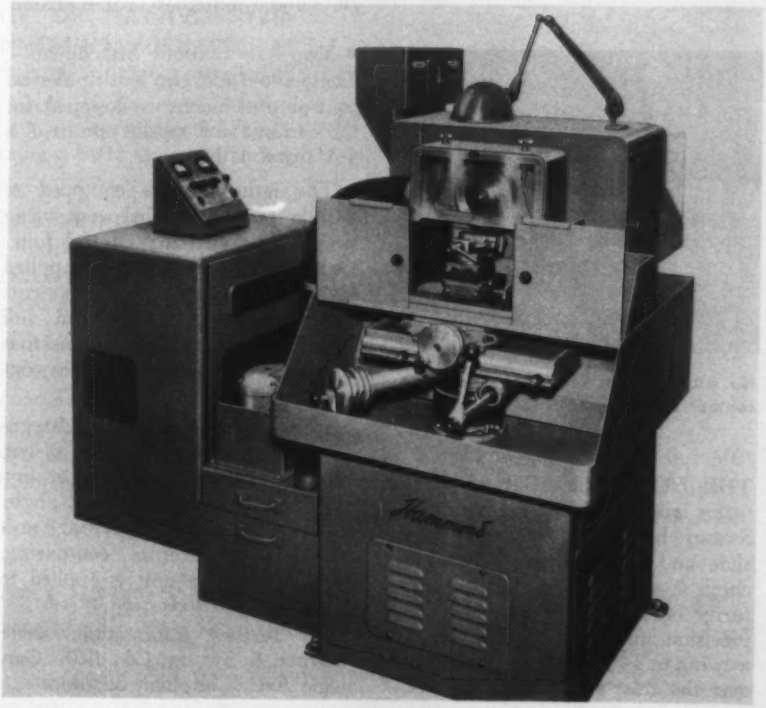
HERE is an electrolytic chip breaker and oscillating cup wheel grinder that is suitable for low and medium volume grinding. It's available with conventional, manual spark, or automatic spark controls.

The machine has oscillating cup wheel grinding on one end and chip breaker grinding on the other. It's equipped with a built-in, 150 ampere Anocut power pack with manual spark control or a standard Anocut power pack with automatic spark control.

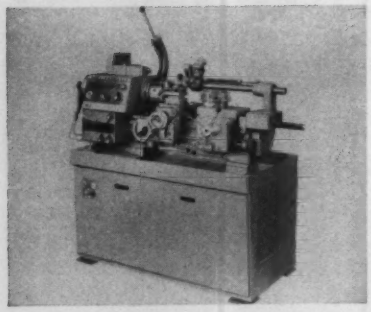
The company says the unit permits the operator to grind faster, rough and finish in one operation, eliminate heat fractures, and save 80 to 90 per cent in diamond wheel consumption.

Standard equipment includes a VCSE general vise, GSE compound protractor, and self-cooling adjustable light fixture.

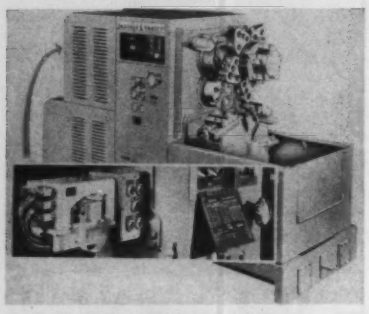
For further information, *write* Hammond Machinery Builders Inc., 1611 Douglas Ave., Kalamazoo, Mich.



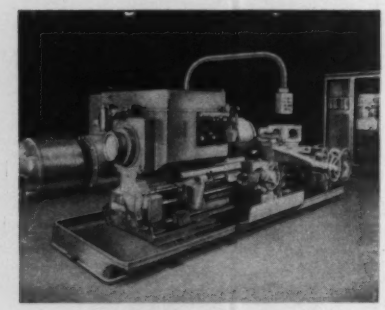
Company Develops Lathes, Attachments



No. 2 Micro-Cut Turret Lathe



Numerical Tape Control Developed for 1AC Single Spindle Automatics



No. 4A lathe has Servo-Tape, two axis contour attachment

THE NO. 2 Micro-Cut, universal turret lathe developed by Warner & Swasey has a full universal cross slide and square turret. The machine has the characteristics of a turret lathe and the accuracy of a precision instrument lathe. It has a swing of 14 in. over the bed (6 in. over the cross slide).

Standard attachments include single point overarm threading; air operated collet chuck and bar feed up to 1¼ in. capacity; 6 in. two and three jaw hand or air chucks; and Electro-cycle, automatic headstock control. Other model configurations include a plain turret lathe and a precision chucking turret lathe.

o Numerical Tape Control—A new numerical tape control is optional on Warner & Swasey's No. 1AC single spindle chucking automatic. It controls all operating functions, including speed and feed changing, cross slide movements, and lengths of cut.

Only speed range selection and installation of the proper feed gears need separate handling during setup. With tape control, the operator can quickly switch from tape programing to the standard electromechanical control. The control uses telephone relays. No electronic circuitry is used. Similar systems will be used on the 2AC and 3AC chucking automatics and for the 2AB single spindle automatic bar machine.

• Two Axis Contour Attachment—The Servo-Tape, two axis numerical control attachment is designed for the carriage and saddle aprons of a 4-A turret lathe.

The lathe can be equipped to handle tape controlled contouring work. The auxiliary control functions used in contouring are applied by standard machine components (through the feedshaft and full length lead screw). It means that the tape system doesn't hinder conventional turret lathe work.

In addition to contouring irregularly shaped surfaces, the system can also be used for straight line cuts and taper cuts of any angle. Usually, the machine's carriage unit is used for external contouring, while the saddle unit is applied to the internal surfaces.

For further information, *write* Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, Ohio.

Ultrasonic Soldering Iron Doesn't Require Flux

AN 8 ounce, 10 watt ultrasonic soldering iron can handle a wide range of materials without flux. It's ideal for soldering semiconductor materials and metals such as aluminum, magnesium, and their alloys (especially those having rapid surface oxidation). The oxide films are removed by the ultrasonically activated tip, and the molten solder then forms a bond with the surface.

It operates on 115 volts, 60 cycles, and uses standard, replaceable, General Electric soldering iron tips. The company says unskilled workers can easily be trained to use the iron in minutes.

For further information, *write* Vibro-Ceramics Div., Gulton Industries Inc., 212 Durham Ave., Metuchen, N. J.

Electrical Lift Powered By Its Own Batteries

AN electrical lift magnet (called Magna Lift) has a self-contained power supply and eliminates the need for cumbersome chains and hitches. The unit has about a 4000 lb capacity. It's powered by a built-in, replaceable, dry charge battery that's standard. It has a built-in charger with a plug-in receptacle and control panel and charging indicator.

For further information, *write* Dept. S6, Hanchett Magna-Lock Corp., P. O. Box 816, Big Rapids, Mich.

Tape Controlled Unit Does Boring, Drilling, Milling

A HORIZONTAL boring, drilling, and milling machine (Model 660 FC) can do high speed carbide milling. The unit has Gray's Televersal attachment which permits low mounting, constant rigidity, heavy feeds, and fast cuts.

It's equipped with a numerical control system with full tape control. The unit has a visual readout that indicates the exact location of a machine tool element, and dial control of desired co-ordinates to

Anneal 430 Trim Stock and All Other Stainless Strip to a Durable, Mirror Finish *Without Chrome Depletion* in

THE ELECTRIC EF FURNACE CO.
GAS • OIL • ELECTRIC

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Check these outstanding advantages

✓ **DESIGNED AND BUILT BY THE WORLD'S MOST EXPERIENCED BUILDER OF STAINLESS STRIP BRIGHT ANNEALING FURNACES.** 15 efficient, high production lines installed or under construction. EF has more installed capacity, and more experience in bright annealing stainless strip than any other furnace manufacturer.

✓ **VERTICAL OR HORIZONTAL DESIGNS**—whichever best suits your building conditions and specific production requirements.

✓ **FUEL FIRED OR ELECTRICALLY HEATED**—to use whichever heat is most economical in your plant. No restriction on width. Electric furnaces heated with our proven cast alloy resistor elements, assuring highly efficient heating. None better.

✓ **EF JET OR STATIC COOLING**—jet or combined jet and static cooling, shortens the cooling section.

✓ **HYDROGEN, DISSOCIATED AMMONIA OR VACUUM PROCESSING.** Continuous vacuum furnaces, one of EF's latest developments, save on overall installation and operating cost.

✓ **COMPLETE UNIT RESPONSIBILTY**—furnished completely erected with all controls, terminal equipment and product handling, ready for immediate on-line operation.

For the highest finish, and most durable corrosion resistant surface, contact the EF heat treating engineers. ***You'll find it pays!***

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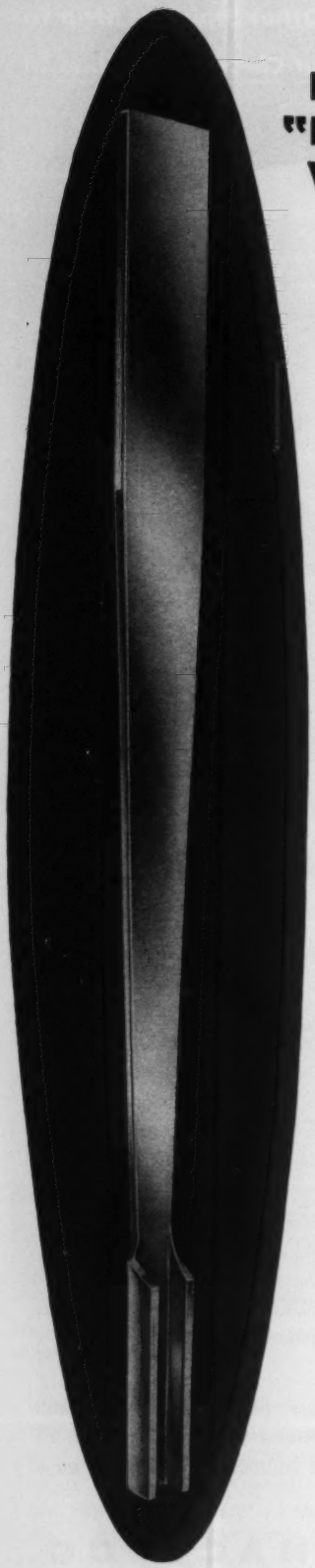

Approximately 1¾ actual size

HOW A "BROKEN ARM" WAS CURED . . .

. . . with miller

200-PLUS

PHOSPHOR BRONZE

Problem: How to form the intricate bend in this contact arm—without fracturing—and still use a spring temper material with good properties of resiliency. This was the problem that faced a precision stamper* in producing the arm for a leading manufacturer of electrical equipment.

Each alloy tried was subject to fracture . . . until Miller came along with 200-PLUS Phosphor Bronze, a spring temper alloy with a forming ability that permitted the most exacting bend—without fracturing—and with qualities of resiliency that actually exceeded the requirements of the job.

Result: The fracturing problem was licked . . . the supplier was able to improve on the part specifications . . . not a single tooling change was necessary.

*Name and case history on request

• • •

Sound like one of your problems? The chances are good that Miller specialists can help you solve it—with either a standard alloy or one specially tailored to your requirements. Contact your Miller man.

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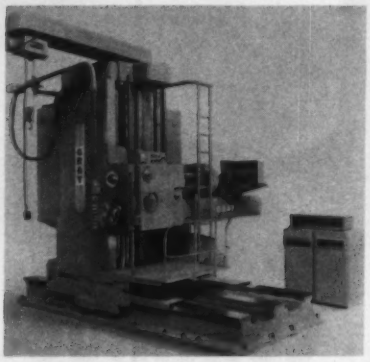
ROLLING MILL DIVISION

THE MILLER COMPANY
MERIDEN, CONN.

. . . WHERE PHOSPHOR BRONZE IS THE MAIN LINE—NOT A SIDELINE

NEW PRODUCTS and equipment



obtain machine element movement. Servicing and maintenance problems are minimized by modular construction.

The machine has a 6 in. diameter nitrided spindle, 60 in. axial bar travel, 72 in. vertical head travel, 96 in. column travel on runway, and 24 in. of column crosstravel.

Other units from G. A. Gray Co. include a new universal planer that can finish-plane simultaneously while double cut roughing and a planer type milling machine with new attachments and improved design.

For further information, *write* G. A. Gray Co., 3611 Woodburn Ave., Cincinnati, Ohio.

Molding Presses Have Two Lower Mold Halves

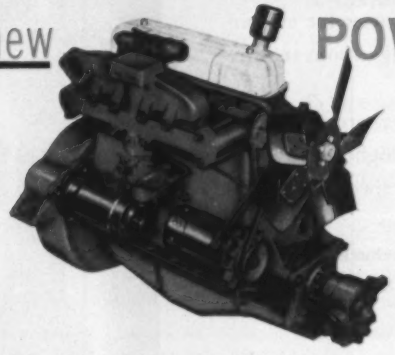
A NEW approach to the molding of plastic parts with inserts makes loading of the inserts into the mold easy and accurate. The design has a horizontal turntable with two identical lower mold halves at opposite stations.

When one of the lower mold halves is in the normal molding position, the other lower mold half is outside the press in a convenient and accessible position for insert loading. The finished pieces are ejected automatically from the mold by rising vertical pins and are then removed from the the pins by the operator. Next, a fresh charge of inserts and preforms is loaded into the newly emptied mold half to make it ready for the next cycle.

All press motions are sequence controlled and are completed auto-

3 NEW F series ALLIS-CHALMERS LIFT TRUCKS

with new POWER-CRATER engine



Unique crater-shaped piston head in POWER-CRATER engine, built by Allis-Chalmers, sets up violent swirling turbulence, thoroughly mixing fuel and air. Because of this proper mixing, a higher percentage of fuel is transformed into useful energy. Thus, Allis-Chalmers F series lift trucks effect substantial savings in fuel.

POWER-CRATER and POWER-SHIFT are Allis-Chalmers trademarks.

Outstanding working ability and convenience

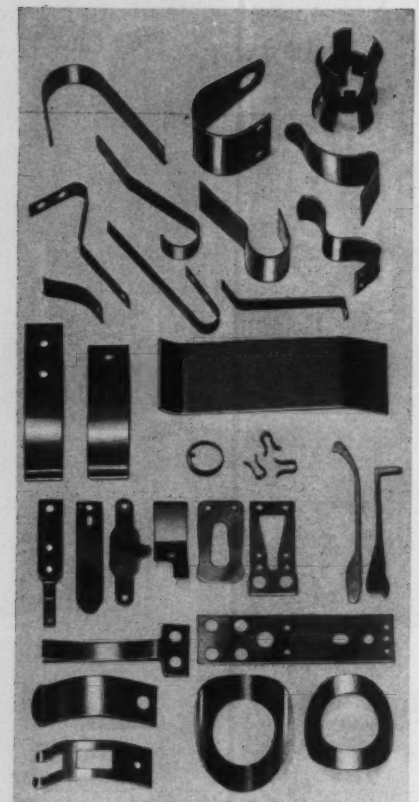
- Power, balance and weight distribution to climb steep grades
- Roller channel steel masts for smooth, fast lifting
- Simple, "easy-to-turn" steering, one-lever gear shift
- Pivoted steer axle for smoother riding, positive traction
- Comfortably wide, adjustable, ventilated-cushion seat
- Familiar automotive-type controls, key starting switch
- Positive, safe braking — two systems: large two-directional hydraulic brake, mechanical parking brake
- Solid 2″ x 5″ bar-steel, heavy-duty frame—foundation for long life and dependability
- Easy serviceability—seat tilts up for easy access to engine, clutch change in only 30 minutes, counterweight quickly removed
- Replaceable wet cylinder liners in engine save time and money
- Optional transmissions — standard or POWER-SHIFT drive

Let your dealer show you how new F series trucks *do more, save more.* Send for new bulletin BU-640. Allis-Chalmers, Milwaukee 1, Wisconsin.

BH-142

ALLIS-CHALMERS

POWER FOR A GROWING WORLD



SANDVIK

SPRING STEEL QUALITY

Earns Its Pay By PRECISE PERFORMANCE

Where performance is important, Sandvik spring steel quality is well worth its price. Many spring steel users have found that Sandvik delivers the *exact* performance they want under their tools and in their products.

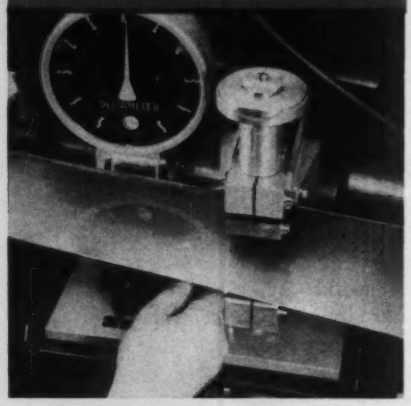
Sandvik's purity, small lot processing and painstaking quality control assures your money's worth in consistent quality performance.

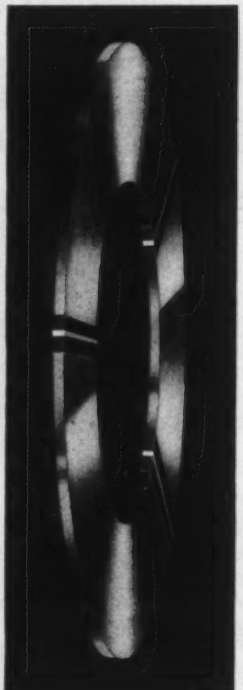
In addition to the wide variety of qualities and sizes carried in stock, Sandvik has local facilities for custom-processing and finishing to your requirements.

For specific physical properties plus accurate flatness, straightness, width, gauge and edge finish, specify a Sandvik spring steel.

Send for free brochure on various Sandvik cold rolled and hardened and tempered strip steels.

Strip thickness is checked during rolling and at final inspection with a "Deltameter", an instrument developed at Sandviken for measuring variations of thousandths of a millimetre.





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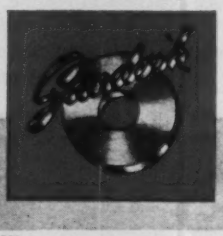
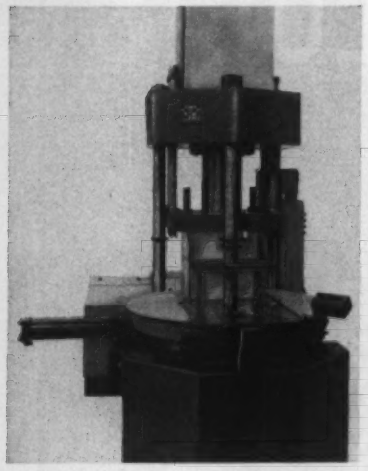


SS-200



matically after the cycle start button is pressed. You can get it equipped with an automatic preheater, an automatic feeder to transfer the preforms into the mold cavity, and an automatic insert loading device.

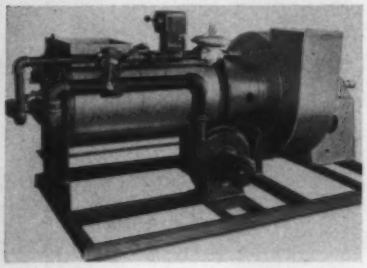
The first models to be built will be 150 ton units; larger and smaller sizes will be available.

For further information, *write* Plastics Equipment Div., F. J. Stokes Corp., 5500 Tabor Rd., Philadelphia 20, Pa.

Gas Air Heaters Supply Recirculated Hot Air

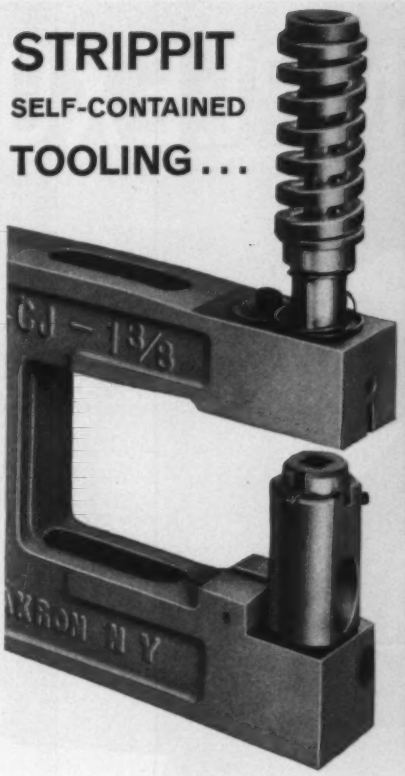
WITH the series of heaters developed by W. S. Rockwell Co., you can supply recirculated hot air (up to 600° F) to ovens, dryers, and other heat processing equipment.

The heater body is insulated and has a low pressure gas burner and a combustion air blower firing into a refractory combustion block centered in a combustion tube. A conical baffle beyond the tube deflects the hot gases into a recirculating air stream. The pressure burner system



STRIPPIT
SELF-CONTAINED
TOOLING . . .

cuts costs 10 ways



1. no expensive custom dies—save all the time and cost involved in designing and building custom, single-purpose dies.

2. lower labor costs—no high-salaried tool and die makers are needed. Any good bench man can set up Strippit Tooling.

3. minimum tool investment—Strippit units can be kept in continuous use. You have no heavy investment in idle dies—no die storage problem.

4. shorter lead time—as soon as the pattern is ok'd, Strippit Tooling can be set up and put into production *immediately*.

5. faster, more accurate setups—Strippit units are self-contained, self-stripping and permanently aligned—bench-assembled on drilled templates, T-slotted plates or bed rails. Nothing is attached to the press ram. No need for die spotting and setting.

6. press downtime cut—as each run is completed a new Strippit setup is already waiting for the press. Self-contained design permits punch replacement in the press. Downtime is kept to a minimum.

7. unlimited versatility—Strippit units can be set up in any hole pattern and used over and over again—for long press runs or quick-change pilot runs—in stamping presses or press brakes.

8. a complete line from a single source—punching units with standard or special tooling, for punching up to ¾" mild steel—standard and special notching units for work up to ¼" mild steel.

9. nationwide sales and service—by trained tooling methods engineers in all major industrial areas. Manufacturing plants in Akron, N. Y., Los Angeles, Calif.; warehouse in Chicago, Ill.

10. specify "Strippit"—the original system of self-contained tooling. There are imitations but no substitute for Strippit engineering know-how, tested and proved designs and materials, first-class workmanship and the other advantages of doing business with a reputable organization that has been in business for 35 years.

FOR COMPLETE INFORMATION—write for the new Strippit General Catalog.

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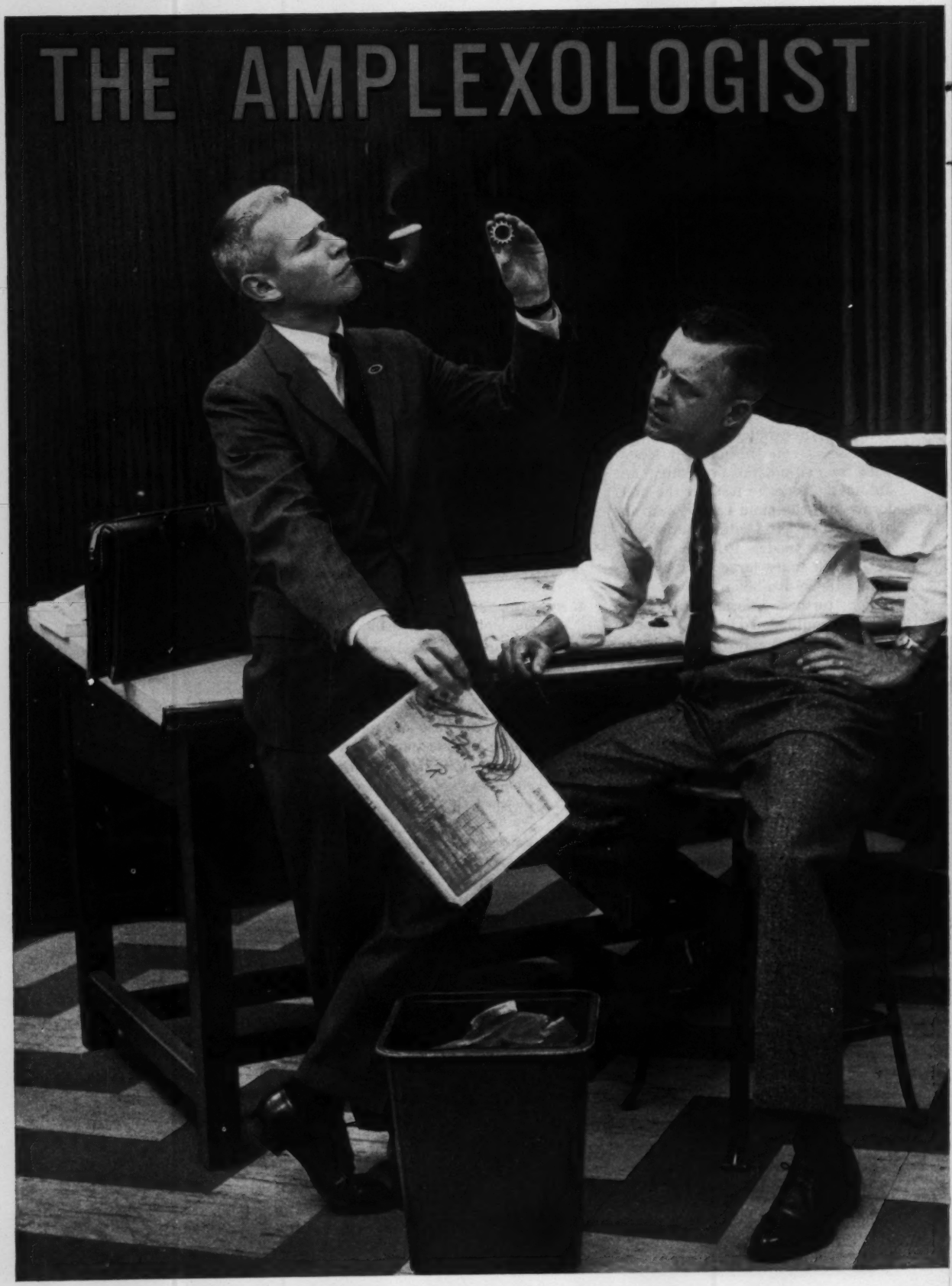
A UNIT OF HOUDAILLE INDUSTRIES, INC.

THE AMPLEXOLOGIST



The Amplexologist has a high regard for prospective customers' blueprints. He finds it necessary upon occasion, however, to put them respectfully aside. Especially when he's told: "We tried to make this part out of powder metal a couple of years ago but the supplier couldn't meet our specs."

The Amplexologist, you see, has heard this song before. That's why he puts down the prints and picks up the part. And starts probing.

What does this part have to do? Under what conditions? Any special strains? Impact? Where? What about the configuration? Is this contour functional? Are these sharp angles necessary?

Often as not, the answers to these questions hit pay dirt. They usually reveal, in fact, that with a little redesigning another "impossible" part can, after all, be made better and cheaper through advanced powder metallurgy (i.e. Amplexology).

We're happy to say that most manufacturers are eager to eat their own specifications anytime they can save thousands of dollars and still maintain (or improve) quality. Their willing appetite has helped make us the world's largest and most experienced producer of powder metal parts. One more reason why manufacturers say, **When it comes to powder metallurgy—Amplex has the answer.**

A LITTLE RE-DESIGNING...

The part shown is an engine fan-pulley hub. It was formerly a solid circular casting. The manufacturer had to machine the face, bore the ID, drill and tap four holes. The Amplexologist re-designed the hub into its present cloverleaf shape—to reduce weight and cost of material. It is now being produced by powder metallurgy as a finished precision part that requires no machining—except tapping the holes. Total savings about 33%.

AMPLEXOLOGIST

SEND COUPON **... if you'd like to talk over your product with the Amplexologist. Don't hesitate. He's always happy to get out of the office.**

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Please have the Amplexologist call to look into the possibility of using powder metal parts in our product.

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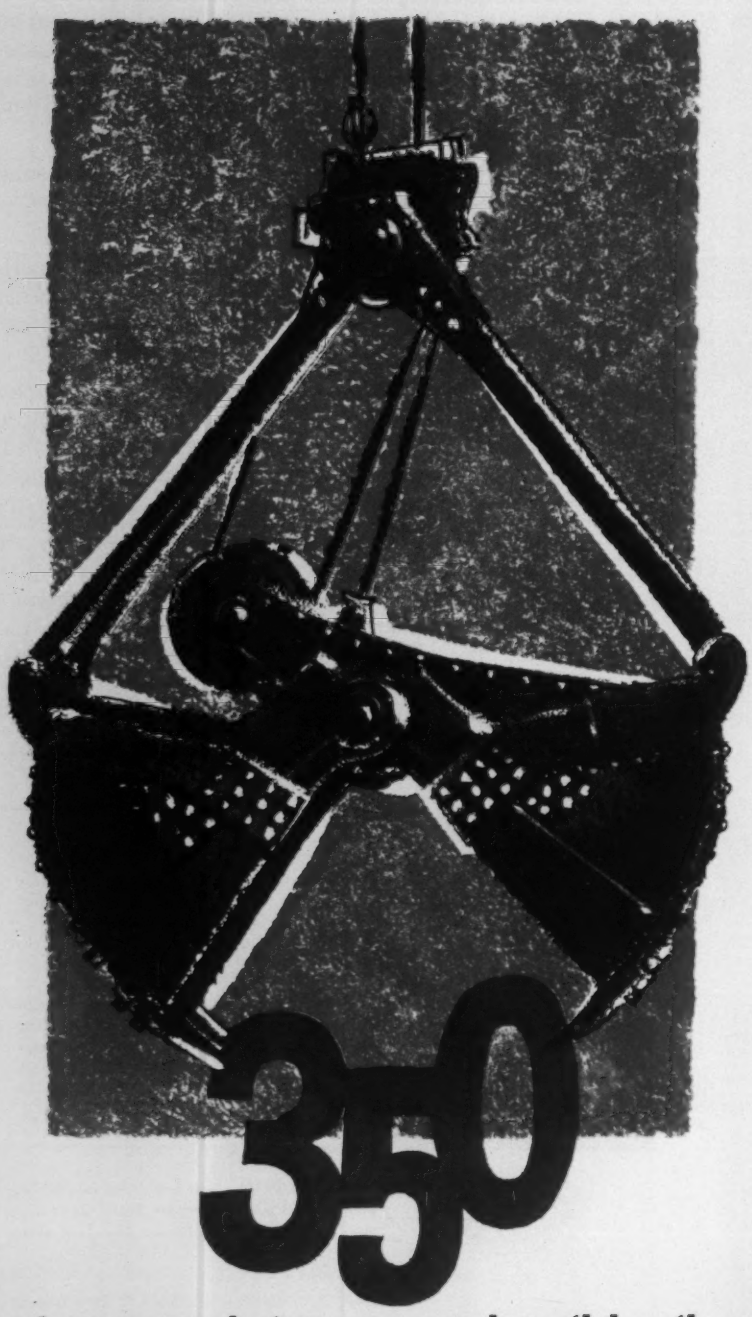
A CHRYSLER OILITE PRODUCT



sizes and types make this the most complete line of Clamshell Buckets anywhere. Write for free illustrated catalog. Blaw-Knox Equipment Division, Pittsburgh 38, Pa.

BLAW-KNOX

Clamshell Buckets

provides combustion control. The heaters are made in six sizes—500,000 to 4 million Btu per hour.

For further information, *write* W. S. Rockwell Co., 200 Eliot St., Fairfield, Conn.

Adjustable Speed Drives Use Alternating Current

ADJUSTABLE speed, ac drives called Magnaflow have integral unit construction and are rated from ¼ to 100 hp. Larger drives with separate motors mounted on bedplates are available up to 700 hp (they're liquid cooled).

The electromagnetic drive can be connected to conveyors, fans and pumps, winders, forming machines, metal slitting units, and other similar equipment.

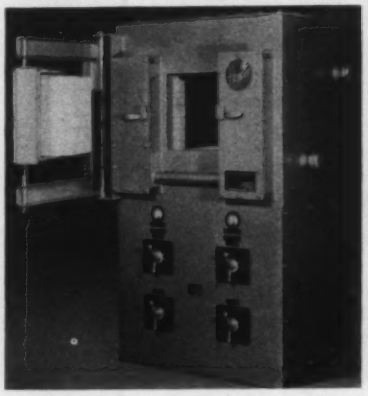
The drive can be set before or during operation to deliver any desired speed within its range. A tachometer monitors the output speed and automatically corrects it, regardless of load changes. Many versatile modifications are available.

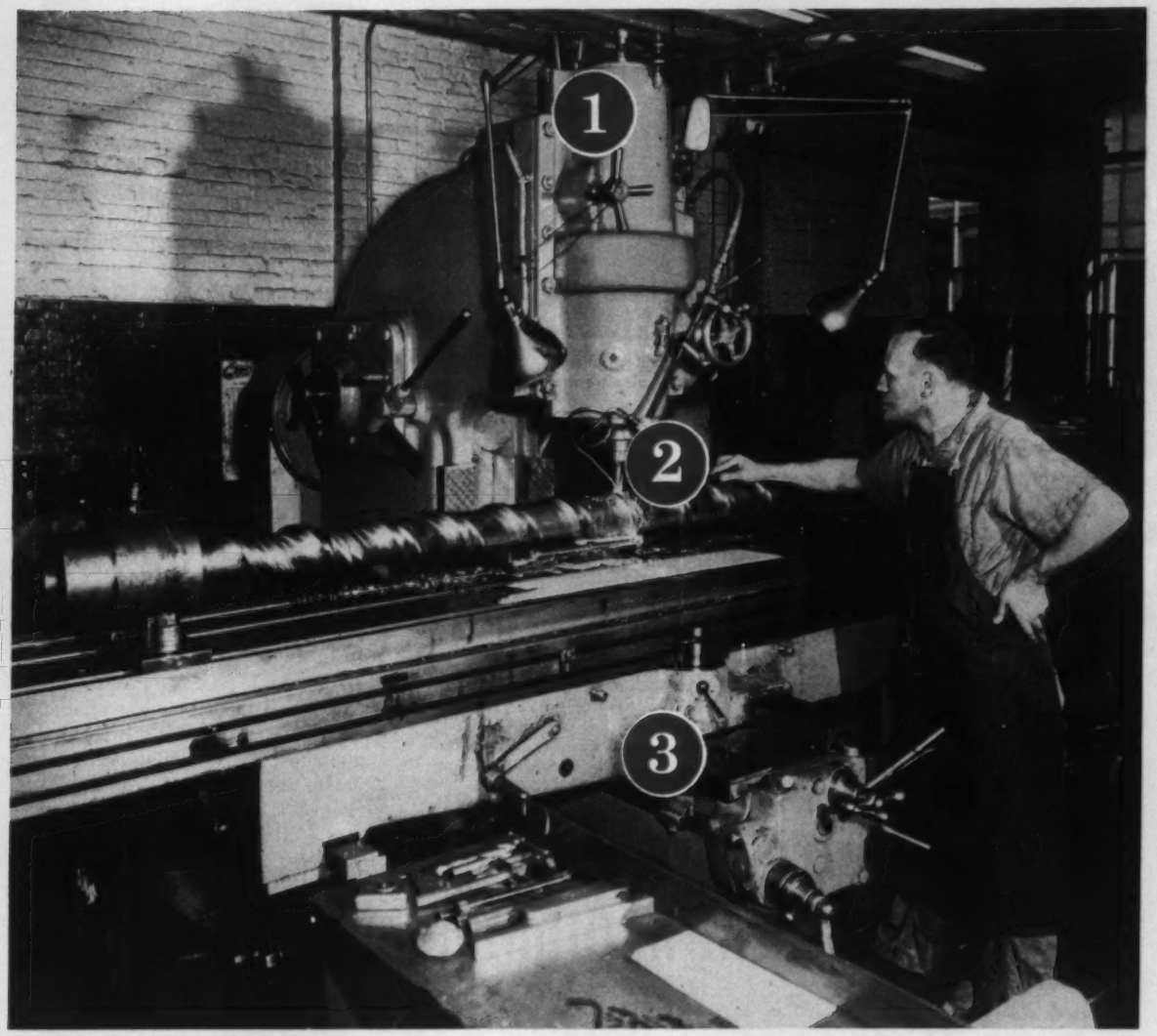
For further information, *write* Westinghouse Electric Corp., P. O. Box 2099, Pittsburgh 30, Pa.

Industrial Box Kilns Rated Up to 2750° F

A LINE of industrial box kilns is built in 18 models, with capacities of 0.75 to 16.7 cu ft. Operating temperatures can go as high as 2750° F.

They are readily adaptable to





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1. NEBULA® EP GREASE helps bearings run true longer . . . maintains precision running of plain and anti-friction bearings. Exceptional for its stable consistency, oxidation resistance and load-carrying ability throughout a wide temperature range.

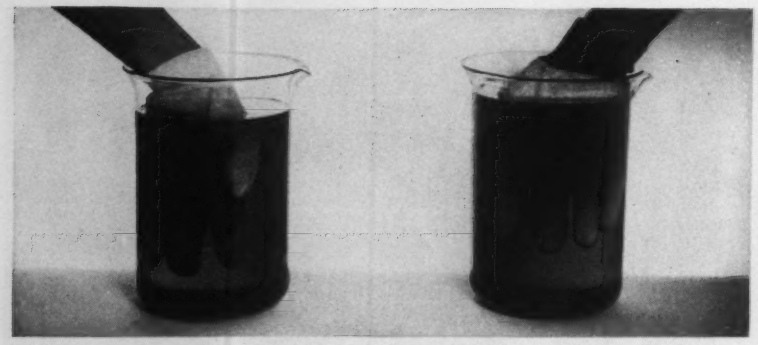
2. KUTWELL® EP 66 CUTTING OIL speeds fine finishes . . . increases tool life; permits higher speeds and deeper cuts. Leaves an easy-to-see film for highly efficient lubrication. Contains a bactericide to keep emulsions sweet smelling and serviceable for longer periods.

3. FEBIS® K LUBRICANTS insure smooth-sliding ways . . . boost precision by eliminating "stick-slip" movement. These lubes actually make static friction less than sliding friction; easily pass the stick-slip test.

There's a complete line of specialized Esso Lubricants to help improve your operations. Contact your local Esso office or write: Esso Standard, Division of Humble Oil & Refining Company, 15 West 51st Street, New York 19, New York.

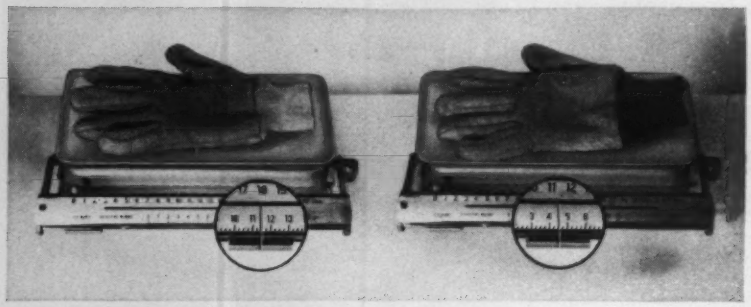
Esso

In Industry after Industry..."ESSO RESEARCH works wonders with oil"



Here is an untreated terry cloth glove being soaked in oil.

Here is an oil-repellent Oilmac glove getting the same treatment.



Now we weigh the untreated glove. It is oil soaked and soggy, weighs a full 11½ ounces. Not very comfortable to wear!

But the Oilmac has only surface oil, weighs a mere 4½ ounces. Both gloves weighed 2½ ounces before being immersed.

Proof: Untreated gloves soak up oil...new Oilmacs stay light, comfortable!

Now you've seen it! Specially treated Oilmacs really repel oil . . . stay light, comfortable, flexible even after *soaking* in oil. Mind you, there's nothing wrong with the untreated gloves: we sell carloads of them, and they are fine for most applications. But where oil is a problem, Oilmacs are the answer! Moreover, new Oilmacs are far more cut resistant than expensive leather gloves . . . can be reconditioned with virtually no loss in oil resistance . . . and are interchangeable, so any two make a pair, any pair gives you four working surfaces. Write today for literature about these new work gloves by Jomac!

Jomac also makes a complete line of North PVC Coated Gloves and Wet Weather Garments

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"Jomac Sells Quality...and Quality Sells Jomac!"

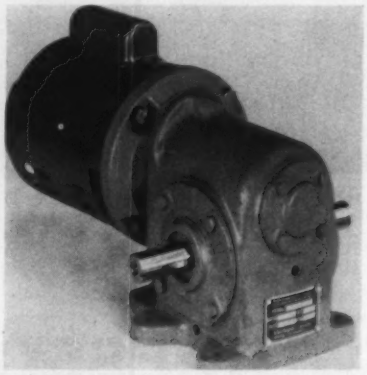
firing and calcining abrasives, high quality ceramic ware, porcelain, and precision electronic ceramics, such as ferrites, steatites, and titanites. The kilns have silicon carbide hearths and are lined with insulating brick. Silicon carbide heating elements are mounted horizontally, front to back, on the left and right sides of the chamber. All terminals and wiring are enclosed.

The refractories are encased and supported within a steel shell. You can get gas tight construction for use with neutral, inert, or reducing atmospheres.

For further information, *write* Harper Electric Furnace Corp., 110 Pearl St., Buffalo 2, N. Y.

Motor and Reducer Are Flange Connected Units

A C-flange gearmotor is available in capacities of 1/12 to 2 hp with reductions of 5:1 to 60:1. Reductions are in increments of 5 up to 30:1. From 30:1, reductions are in increments of 10.



The motor and reducer are separate, flange connected units. The reducer can be supplied without a motor (for application to standard NEMA motors).

For further information, *write* Morse Chain Co., Ithaca, N. Y.

Swinging Arm Unloader Comes in Three Models

A SWINGING arm press unloader is electrically controlled by the press. It will operate at speeds up to 40

J & L Steel Service Centers—efficient and dependable. Anywhere you look—from the order department, through every processing operation, to the well-organized shipping floor like this one—you'll find something new, something better at The Department Store of Steel. Unparalleled expansion, new buildings, the latest machinery and equipment, increased stocks of steel, stainless and aluminum, and skilled warehousemen trained to give *extra* care to every order—all add up to faster, more efficient service for J & L customers.

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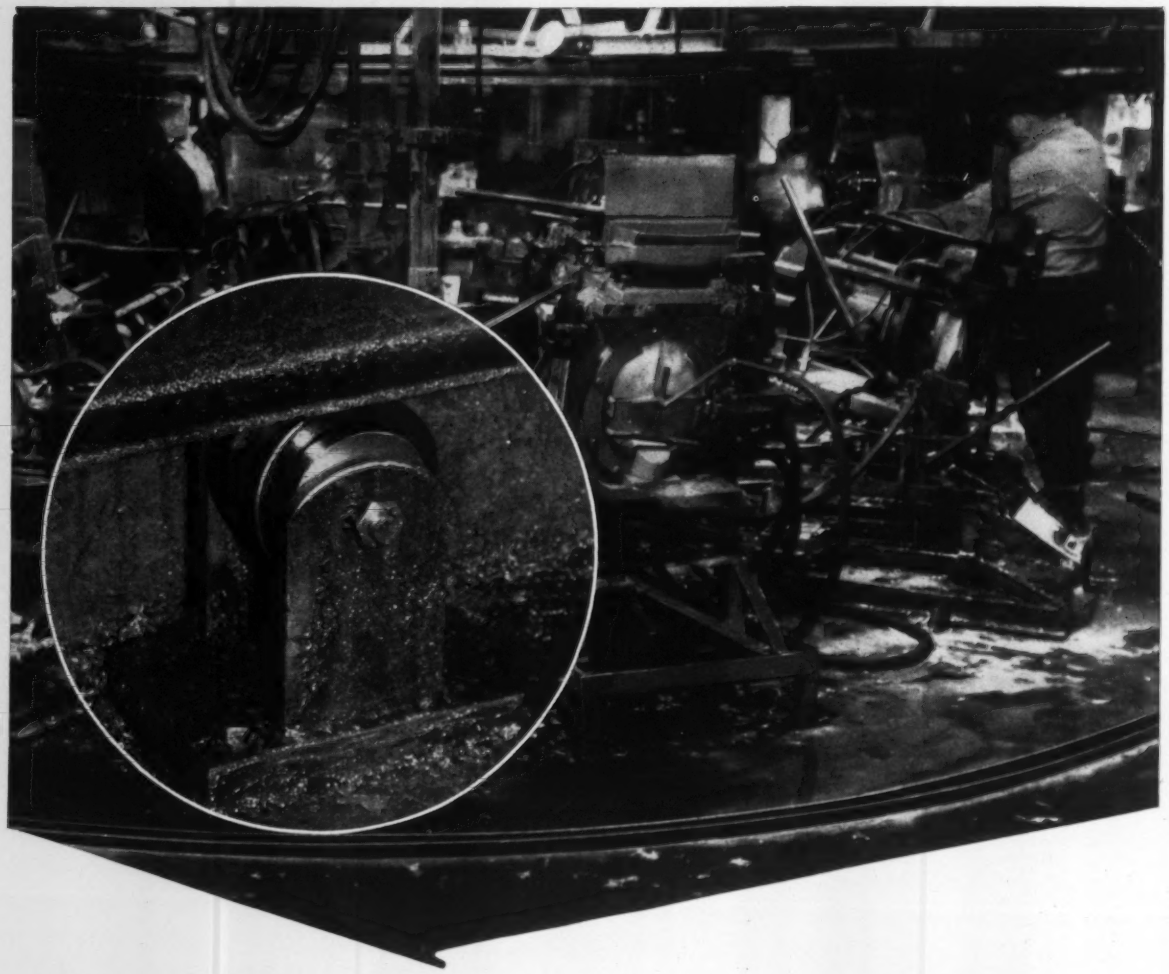

Bearings, Inc. turned this turntable from a costly maintenance problem into a smooth, trouble-free operation!

Our customer, an aluminum foundry, designed and built this system for continuous and automatic pouring of permanent mold castings. The turntable is approximately 20 feet in diameter. Supporting the table, which weighs several tons, were 20 large, double-row bearings. The life of these bearings was only a few weeks and their cost, plus downtime, was becoming increasingly expensive.

Our bearing engineers were asked for a solution and, after an investigation, recommended a camroll bearing. Now, after many months of operation, all turntables in the plant are equipped with the bearings we recommended and there has not been a bearing failure in that period!

If you have a problem involving bearings, call the Bearings, Inc. branch nearest you for expert help. We are the authorized distributor for all the bearings we sell —your guarantee that the bearings we deliver will be of the latest manufacture and right for your application!

Providing bearing service in the North ➤ **BEARINGS, INC.**

OHIO: Akron • Canton • Cincinnati • Cleveland • Columbus • Dayton • Elyria • Hamilton • Lima • Lockland • Mansfield • Painesville • Toledo • Youngstown Zanesville • **INDIANA:** Ft. Wayne • Indianapolis • Muncie • Terre Haute • **PENNSYLVANIA:** Erie • Johnstown • Philadelphia • Pittsburgh • York **WEST VIRGINIA:** Charleston • Huntington • Parkersburg • Wheeling • **NEW JERSEY:** Camden • Newark **NEW YORK:** Balanrol Corp., Buffalo • Niagara Falls • **MARYLAND:** Baltimore • **DELAWARE:** Wilmington

and

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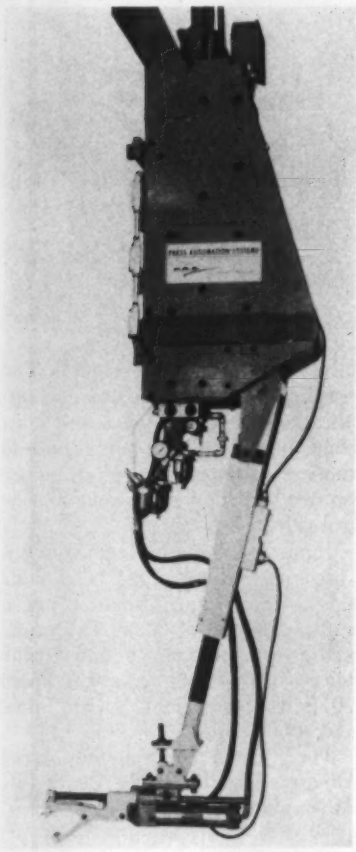
NEW PRODUCTS and equipment



strokes per minute with 45 psi air line pressure.

The swinging arm provides the vertical lift for the stamping with a smooth, nondipping unloading stroke. Cams and oil cylinder cushioning are not used in the operating linkage. Three standard models are available: Small (Series 100), medium (Series 200), and large (Series 300).

For further information, *write* Press Automation Systems Inc., 25418 Ryan Rd., Warren, Mich.

Transmissions Designed For 1 Hp or Less

YOU CAN convert any constant speed input power into an infinitely adjustable output speed with Oilgear's new midget Any-Speed transmission. One or more adjustable speeds can be preset and selected, depending on your choice of integral control devices (in one or both

useful information on castings

DESIGN • PURCHASING • MACHINING

If you want more information about iron castings it's yours for the asking. Just check as many of these bulletins as you would like, clip this ad and mail it to us.

- ☐ Casting Design as Influenced by Foundry Practice
- ☐ Summary of Specifications for Gray and Nodular Cast Irons
- ☐ Hamilton Quality Ductile Iron
- ☐ Engineering and Purchasing Requirements for Gray Iron Castings
- ☐ Engineered Castings from Hamilton Foundry
- ☐ Handbook of Meehanite Metals
- ☐ Machining and Abrasive Finishing Gray and Nodular Iron
- ☐ Glossary of Terms—For Producers, Users of Iron Castings

Iron Castings have tremendous design flexibility—but there are certain danger points to be avoided. In addition, there is an engineered iron best suited to your combination of design and use requirements. You can get competent advice at any time from Hamilton Foundry engineers on these questions—and any other castings problem on your boards.

Name_____ Title_____

Company_____

Address_____

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GRAY IRON • ALLOYED IRON • MEEHANITE® • DUCTILE (NODULAR) IRON • NI-RESIST • DUCTILE NI-RESIST • NI-HARD

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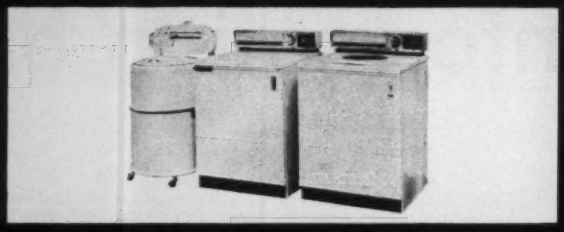
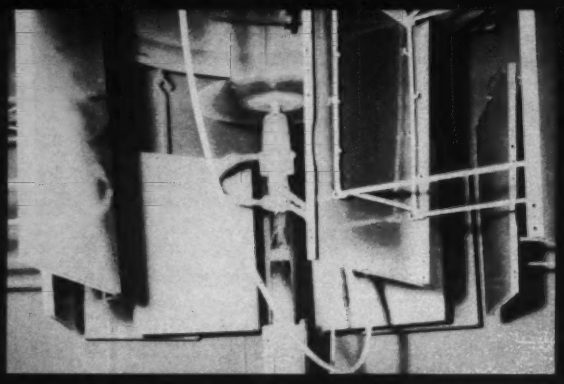


Get their High Quality Finish with



RANSBURG NO. 2 PROCESS

Kelvinator Division of American Motors switched from hand spray to RANSBURG No. 2 PROCESS Electro-Spray to meet increased production schedules . . . improve the quality of the finish . . . and lower finishing costs.

SAVINGS EXCEEDED EXPECTATIONS

Demonstration tests in the Ransburg labs indicated substantial savings in finishing costs, but in actual production, SAVINGS ARE EVEN GREATER than estimated. That's why Kelvinator is now considering RANSBURG Electrostatic Spray Painting for other products of their "white goods" line: Refrigerators . . . Home Freezers . . . Ice Cream Cabinets . . . Electric Ranges, as well as some components.

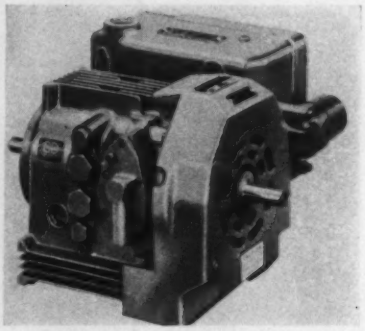
NO REASON WHY YOU CAN'T DO IT, TOO!

Want to know how Ransburg No. 2 Process can improve the quality of YOUR painted products, and at the same time, cut YOUR paint and labor costs? Write for our No. 2 Process brochure. Or, if your production doesn't justify automatic painting, let us tell you about the new No. 2 Process Electrostatic Hand Gun which can be used in either conveyorized, or non-conveyorized painting.

RANSBURG

RANSBURG
Electro-Coating Corp.
Box-23122, Indianapolis 23, Indiana

NEW PRODUCTS and equipment



directions up to 1650 rpm). The transmissions are designed for applications of 1 hp or less and consume power only in proportion to the work they are doing. There are no restricted flow or directional control valves.

Input speed is 1750 rpm. Output speed at normal torque is variable up to 1650 rpm. The unit has a starting torque of 62 in.-lb, a normal torque of 45 in.-lb, and a peak torque of 67 in.-lb. It weighs about 90 lb, is 15 in. long, 14 in. wide, and 10¼ in. high.

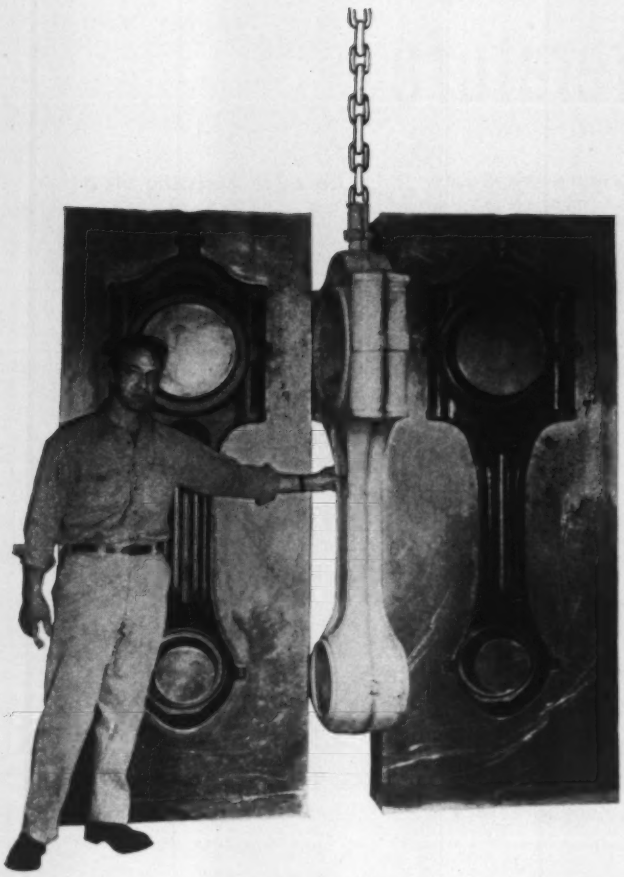
For further information, *write* Oilgear Co., 1560 W. Pierce St., Milwaukee 4, Wis.

Portable Unit Heats Metals To Forming Temperatures

YOU CAN heat metals such as titanium, magnesium, Inconel, and molybdenum (and alloys) to forming temperatures at the drop hammer or press with the portable radiant heater made by Electric Hotpack Co. Inc. It can eliminate rejects that occur when metal ductility is lost through heat loss during transfer of blanks from a remote oven to reforming.

A gold plated, retractable lamp head holding as many as 99 infrared quartz bulbs delivers up to 1500° F at the forming block. The lamp heat is operated by remote cable control and can be raised, lowered, extended and retracted over the workpiece. The lamps are cut off when the head retracts. Fan cooling protects against overheating.

For further information, *write* Electric Hotpack Co. Inc., 5033 Cottman St., Philadelphia 35, Pa.



you get planned high quality closed die forgings... in 5 pounds or 5000

The forging dies you see here are used to produce compressor connecting rods weighing 1250 lbs. The plaster cast shown is for verifying dimensional accuracy.

Size is not a factor. Park's consistent high quality and competitive price stem not only from facilities . . . but *techniques*.

Park's answer to your questions could settle your problem once and for all. Call us . . . and we'll be glad to talk them over. 3034-PD

the park drop forge co.

777 East 79th St., Cleveland 3, Ohio

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Eastern Malleable Iron Co., Naugatuck
New Haven Malleable Iron Co., New Haven 4

DELAWARE
Eastern Malleable Iron Co., Wilmington 99

ILLINOIS
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Chicago Malleable Castings Co., Chicago 43
Moline Malleable Iron Co., St. Charles
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Peoria Malleable Castings Co., Peoria 1
Wagner Castings Company, Decatur

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MASSACHUSETTS
Belcher Malleable Iron Co., Easton

MICHIGAN
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Auto Specialties Mfg. Co., Saint Joseph
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MINNESOTA
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Lehigh Foundries Company, Easton
Meadville Malleable Iron Co., Meadville
Pennsylvania Malleable Iron Corp., Lancaster

TEXAS
Texas Foundries, Inc., Lufkin

WEST VIRGINIA
West Virginia Mall. Iron Co., Point Pleasant

WISCONSIN
Belle City Malleable Iron Co., Racine
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Federal Malleable Company, Inc., West Allis 14
Kirsh Foundry Inc., Beaver Dam
Lakeside Malleable Castings Co., Racine
Milwaukee Malleable & Grey Iron Works, Milwaukee 46

These companies are members of the Malleable Castings Council

NEW literature

Write directly to the company for a copy

Handling Compressed Gases

A wall chart illustrates recommended procedures for the safe handling of all types of compressed gases. It shows the proper methods of receiving, storing, moving, and handling cylinders. Matheson Co. Inc., P. O. Box 85, E. Rutherford, N. J.

Rhodium Plating Solutions

A plastic laminated instruction sheet tells how to make baths for decorative and industrial rhodium finishes. The sheet includes general suggestions on plating procedures, methods for determining the cost of a plated surface, and how to correct common plating defects. Metals & Controls Div., Texas Instruments Inc., 34 Forest St., Attleboro, Mass.

Epoxy Resin Applications

A 12 page pamphlet discusses the industrial uses of epoxy resins. They include automotive, foundry, and aircraft applications. Adaptations of the material for electrical insulating systems and effective adhesive techniques also are described. Dept. RP-58, Ren Plastics Inc., 5422 S. Cedar Rd., Lansing 9, Mich.

NTDMA Tooling Directory

One-thousand tool and die plants (arranged by state and city) are listed in the 1960 directory of special tooling services. The directory has information on each association member (name, address, telephone number, contacts, and the products and services offered). A total of 41 different types of special tooling and precision machining services is listed. National Tool & Die Manufacturers Association, 907 Public Square Bldg., Cleveland 13, Ohio.

Hoist Specifications

A six-page booklet (HMA-300) has tables and recommended minimum standards on lever operated hoists of ratchet and pawl design and load brake design using roller or link coil chain. This is a third of a series of four hoist specifications. Booklets HMA-100 and 200, recently issued, covered electric wire rope and hand chain types. Electric chain hoist specifications will soon be available. Hoist Manufacturers Association Inc., 1 Thomas Circle, Washington 5, D. C.

Nickel Alloy Steels

A 37-page booklet serves as a guide to the design or fabrication of machinery for the construction industry. It is divided into sections that cover properties of materials, power components, motive units, and machinery. The first section outlines the engineering properties of high strength, low alloy steels and heat treated structural steels, alloy constructional steels, cast nickel alloy steels, Ni-Hard and Ni-Resist cast irons, ductile cast irons, and gray cast irons. One chapter discusses applications of materials to diesel engine parts, brakes, gears, clutches, fluid couplings, torque converters, and other power components. Readers Service Section, International Nickel Co. Inc., 67 Wall St., New York 5, N. Y.

Abrasion Resisting Steel

An 80-page handbook gives engineering data, specifications, and chemical composition on the four most popular abrasion resisting steels. The uses of each type of steel are described. Another section of the book gives recommended procedures and products for welding the steels. Indianapolis Machinery Co. Inc, 1959 S. Meridian St., Box 1357, Indianapolis 6, Ind.

Industrial Lighting Guide

An answer guide to RLM labeled industrial lighting equipment has been published for buyers, specifiers, and sellers. The six page guide discusses selection of lighting equipment. RLM Standards Institute, 326 W. Madison St., Chicago, Ill.

NEW BOOKS

Malleable Iron Castings, Malleable Founders' Society, 781 Union Commerce Bldg., Cleveland 14, Ohio, 526 pages, $10

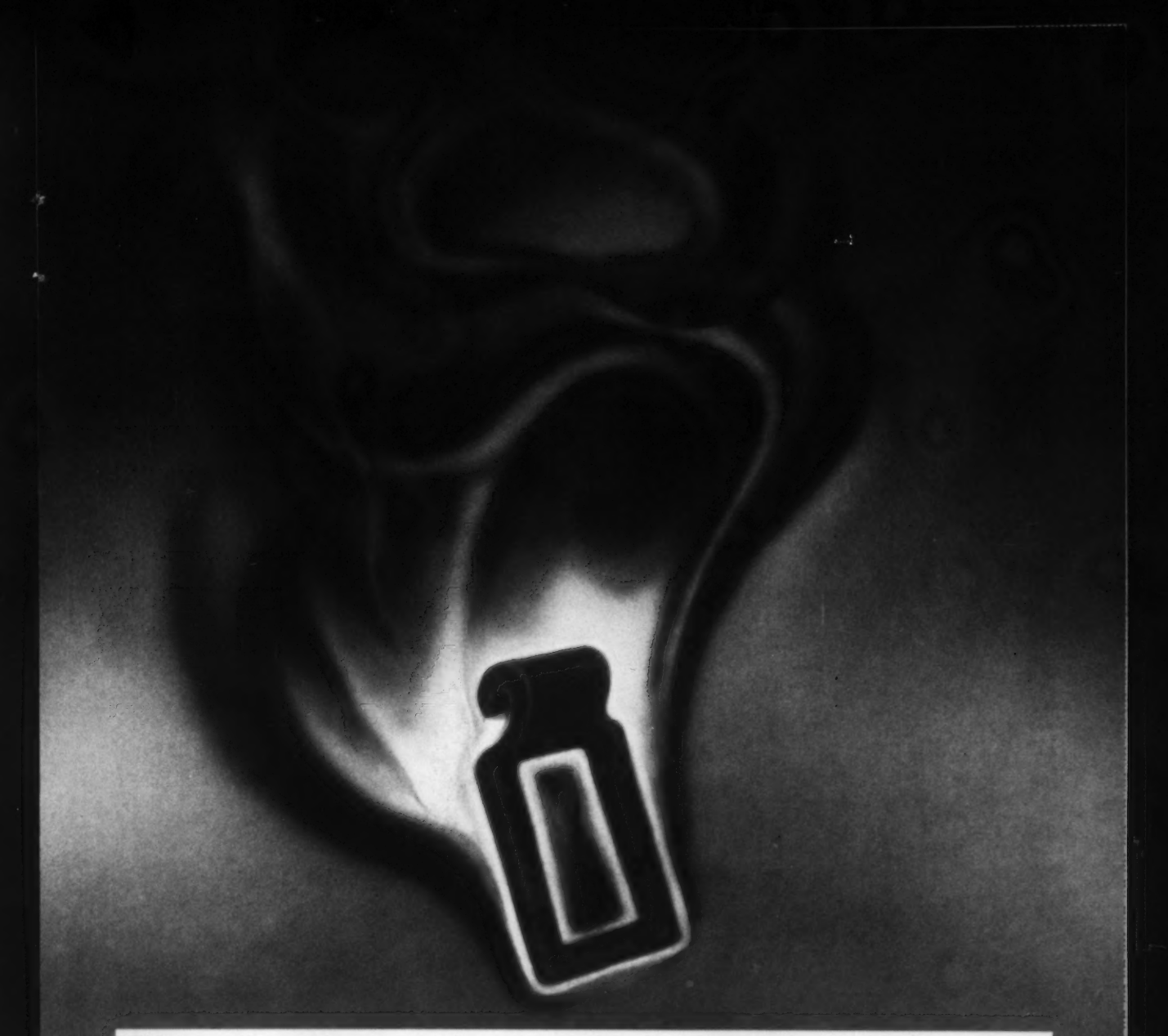
New emphasis has been given to the description of pearlitic malleable iron. Included in the machining chapter are discussions of turning, drilling, boring, milling, and tapping. The chapter includes ten case histories in which each operation in the processing sequence is illustrated. In addition to covering foundry operation, the handbook can help in metal component design, material selection, and in the processing of malleable castings.

Titanium Welding, published by the American Welding Society, Dept. T, 33 W. 39th St., New York 18, N. Y., 24 pages, $1.50

The contents discuss the best methods for welding titanium piping and tubing by the gas-tungsten arc process. Included in the discussion are process, power supply, electrodes and filler metals, titanium grades, joint design and preparation, cleaning, gas shielding, welding techniques, heat treatment, and weld quality tests. The information was obtained from welding literature, company files, research laboratories, and colleges.

ASTM Standards on Metal Powders and Metal Powder Products, American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa., 96 pages, $2.25

The standards cover metal powders, bearings, structural parts, carbides, heavy metals, and terminology relating to powder metallurgy. Descriptions of production processes, mechanical properties, and uses of sintered bearings and structural parts are included as an appendix. A second appendix provides a crossindex of the standards of federal, military, and other agencies.



Schlieren photograph showing heated air rising from Malleable chain link at 1200° F.

For Hot Parts... Use Malleable

Heat them up, cool them off—ten thousand times. Heat them up, keep them hot—indefinitely . . . you'll find you can count on Malleable iron castings for an exceptional combination of safety and economy.

New research demonstrates that the rugged room-temperature characteristics of Malleable castings remain virtually unchanged up to 800° F! More important—from 800° F. to 1,200° F., Malleable castings are unique in providing safe, dependable service **without** sudden drop in strength.

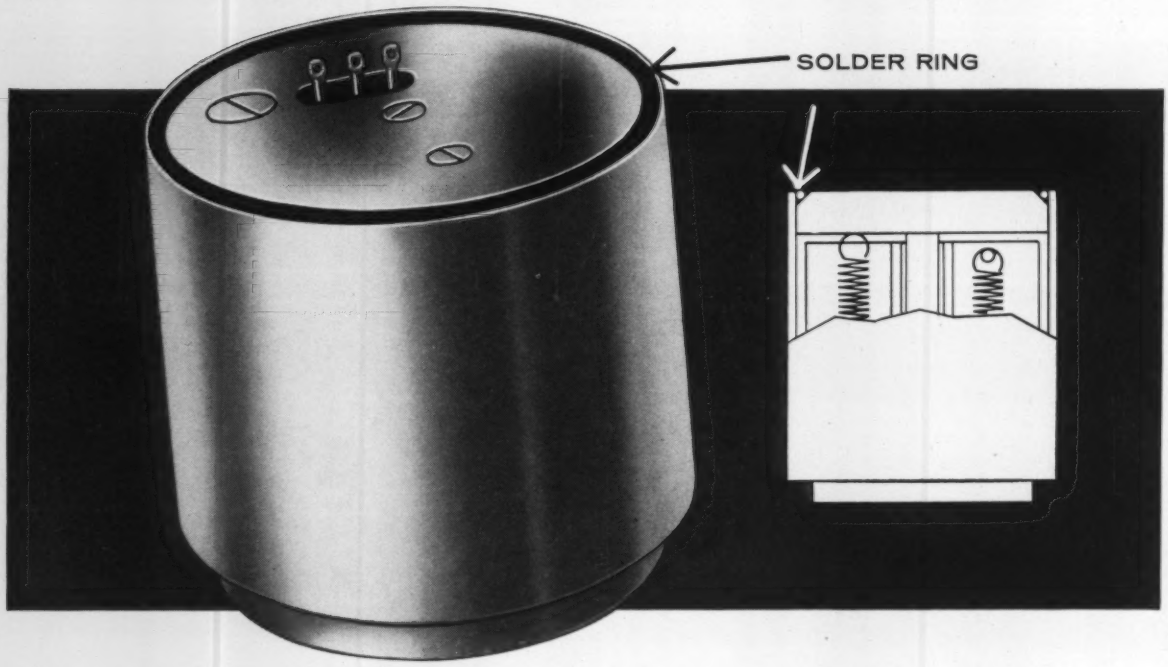
Let a nearby Malleable castings producer help you develop better, more economical parts for elevated temperature applications. Send drawings or an outline of your requirements to any of the progressive companies that display this symbol—

MEMBER
MALLEABLE
CASTINGS COUNCIL

For detailed information on "Use of Malleable Castings in Elevated Temperature Applications," contact any company listed on the opposite page, or Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio.

Precision soldering 7 Times Faster...

with TOCCO Induction Heating*



When G. M. Giannini and Co., Inc., Pasadena, California, switched from old-fashioned methods to TOCCO Induction Heating they increased production of these high-precision accelerometers from 4 to 30 per hour—with a commensurate *decrease* in production costs.

Here's what a Giannini official has to say about the TOCCO installation: "Prior to using TOCCO for this purpose, we had tried soldering irons, normal torches, resistance sealing, and even threaded screw fittings, with uniformly poor results. Essentially, the TOCCO unit has permitted us to build, in production quantities, oil-filled hermetically sealed units that could not be produced in any other way."

Whether your production bottleneck involves soldering, brazing, heat treating or heating for forming it pays you to investigate TOCCO as an economical way to do it better, faster and at lower cost.

THE OHIO CRANKSHAFT COMPANY

Mail Coupon Today—NEW FREE Bulletin

The Ohio Crankshaft Co. • Dept. 5-6, Cleveland 5, Ohio

Please send copy of "Typical Results of TOCCO Induction Brazing and Soldering".

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Imported Steel Menaces Market

LOOK for a gradual decline in steel imports—but don't be too sure that they'll fall short of last year's record 4.4 million tons.

First quarter figures just released by the Department of Commerce show that mill products are coming into the U. S. at an annual rate of 5.6 million tons. No one expects the yearend total to be that high, but marketing executives are admitting privately that the 1960 figures will exceed estimates they made early in the year. They expected imports to drop sharply within a month or two of the strike settlement. In January, they fell moderately—from December's 539,084 tons to 465,050—but they have since held firm. The March total was 464,346 tons.

UP 85 PER CENT— In the first quarter, 1.4 million tons of foreign steel invaded the U. S. market. Volume was 85 per cent above the 758,065 tons that came in during the corresponding period of 1959. Sheet and strip imports soared to 247,339 tons—16 times the 1959 figure. Plates jumped to 144,215 tons—eight times the prior year's total. Large structural shapes more than doubled, from 75,978 tons to 158,849. Pipes and tubing jumped 80 per cent, from 93,984 tons to 168,251.

APRIL INDICATOR— When April statistics are released, steelmakers hope they'll find evidence that first quarter imports were artificially high. If April imports drop to 400,000 tons, a steel industry economist says he'll be "encouraged." If they fall to 350,000 tons, he'll be "delighted" and will stick to his prediction that the total for 1960 won't be more than 4 million. If they're as high as 450,000 tons, he'll be "discouraged."

AUTOMAKERS TAKE STAND—How do automakers feel about buying from foreign mills? Here's what they told STEEL:

- Fisher Body Div., General Motors Corp.—"We have not purchased any foreign sheet steel to date."
- Ford Motor Co.—"Our purchases of foreign steel are made only in cases of emergency. Since the last emergency (steel strike), we have not purchased any foreign steel."
- American Motors Corp.—"Our procurement of steel has always been from domestic sources, except in cases of extreme emergency."
- Studebaker-Packard Corp.—"We will buy domestically produced steel as long as our mills are operating and operating competitively. Only in cases of extreme emergency would we consider purchasing foreign steel. Once you buy it, you're stuck with it—no matter what quality you get."
- Chrysler Corp.—Company officials attribute last year's fourth quarter loss and poor earnings in this year's first quarter to heavy purchases of foreign steel. Much of the tonnage was ordered on a firm basis, could not be canceled, and is still being delivered. Under normal circumstances, Chrysler would probably follow the same practices as other automakers. All are concerned about the public relations impact of buying abroad. Most of them think price is less important than quality, prompt delivery, and technical assistance.

ORDERS DOWN, OUTPUT UP—Orders for most products are still declining. Sales executives expect no sustained improvement in order entry until late July or early August. In the interim, steel production may fall below 60 per cent of capacity. Last week, steelmakers operated their furnaces at 62.3 per cent—1.7 points above the previous week's revised rate. Output: About 1,775,000 ingot tons.

WHERE TO FIND MARKETS & PRICES

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*Current prices were published in the June 6 issue and will appear in subsequent issues.

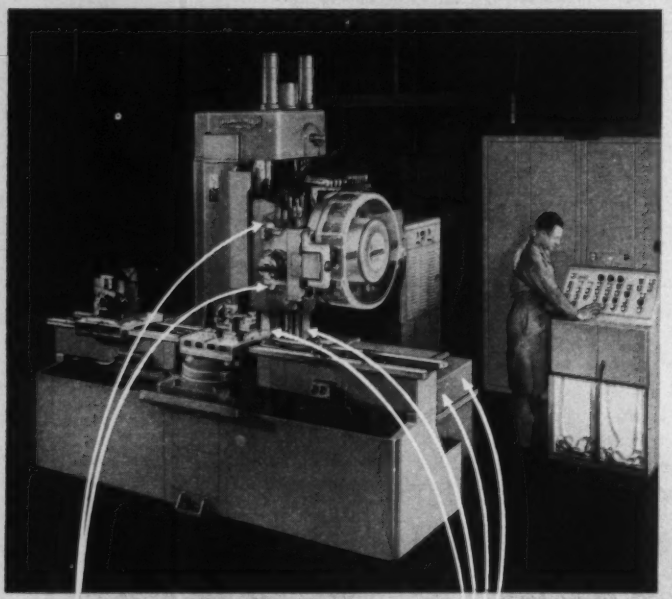
O-KNI-CO METALWORKING news

PRODUCTION FACTS THAT INCREASE YOUR PROFITS

PUBLISHED BY THE OHIO KNIFE CO., CINCINNATI, OHIO

KEARNEY & TRECKER USE HARDENED WAYS MADE BY THE OHIO KNIFE CO. ON NEW MILWAUKEE-MATIC MACHINE

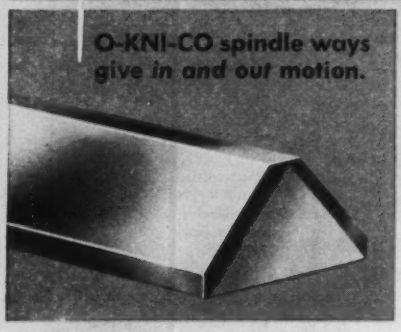
CONTINUOUS ACCURACY OF MACHINE ASSURED THROUGH HIGH WEAR RESISTANT QUALITIES OF O-KNI-CO HARDENED WAYS

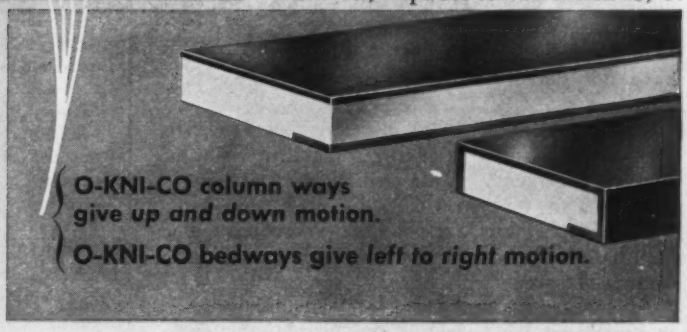


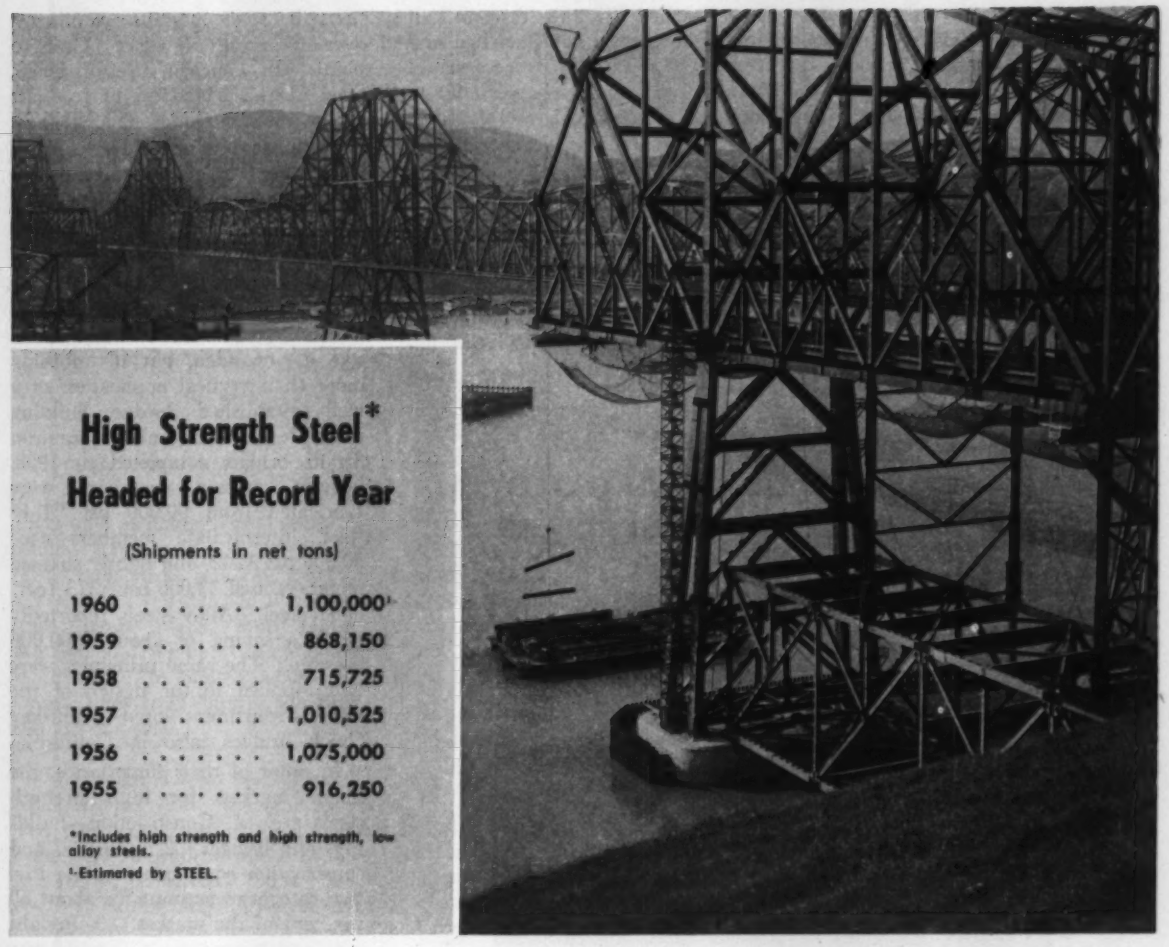
Kearney & Trecker's new Milwaukee-matic with a tape fed numerical control system has to be able to deliver continuous accuracy. That's why hardened ways made by The Ohio Knife Co. were installed. O-KNI-CO ways guarantee continuous machine tool accuracy because of the special way in which they are made. By a time proven process, special analysis tool steel of any thickness is eternally bonded to a soft, tough, easily machinable steel, producing a way that will not warp or bow. Special O-KNI-CO hardening process (65-66 Rockwell C) to the full depth of the tool steel, along the entire length of the way, develops amazing wear resistant qualities.

Ordinary ways of one type steel are usually heat treated by flame hardening, carburizing, etc. This results in variations of depth and quality of hardness along the length of the way. Their degree of hardness is usually well below the minimum standard (63 Rockwell C), necessary to eliminate galling, scoring and excessive wear. These conditions destroy the accuracy of the machine from the very first day of operation, requiring continuous compensations in positioning of work. O-KNI-CO hardened ways are carried in stock in a variety of sizes and shapes and are made to suit specific requirements.

For complete information write The Ohio Knife Co., Dept. 111-AF. Cincinnati 23, O.







High Strength Steel* Headed for Record Year

(Shipments in net tons)

1960	1,100,000[1]
1959	868,150
1958	715,725
1957	1,010,525
1956	1,075,000
1955	916,250

*Includes high strength and high strength, low alloy steels.

[1]-Estimated by STEEL.

American Bridge Div., U. S. Steel Corp.

Extra Strong Steels Set Fast Pace

SIZING up 1960, producers of high strength construction steel have good reasons for feeling cheerful: 1. Their promotional efforts are bearing fruit. 2. All signs point to record shipments, increased capacity, and expanding markets.

Shipments of high strength and high strength, low alloy steels are expected to reach 1.1 million tons —topping by a small margin the volume shipped in 1956 (see table). Shipments of heat treated constructional alloy steels with minimum yield strength of 100,000 psi are also expected to scale new peaks.

• **Less Liquidation** — Producers of high strength steels aren't suffering from widespread inventory cutbacks. The materials are used mainly in engineered jobs like pressure vessels and bridges, so they're bought after fabricators receive orders and know exactly what they need. At a leading mill, output of 100,000 psi steels remains at a peak rate—20 turns a week. Production of 50,000 psi steels averages 70 per cent of capacity as carbon plates and structurals bump along at 45 to 50 per cent.

"The first quarter was the best three month period for sales of high strength steel that we've ever had," a major producer reports. "Our shipments through April were half as large as they were in all of 1957, our biggest year to date." Adds a maker of heat treated alloy steel: "We're undoubtedly headed for a record year. We'll triple our 1959 shipments."

• **Selling in Depth**—Steelmakers attribute their success to continued development of higher yield strength materials and to selling "in depth." As one sales executive put it: "Twenty-five years ago, we introduced 50,000 psi steels, and ever since we've been aiming at higher strengths—at materials that would permit structures to be built lighter and cheaper." When they had full order books, steelmakers didn't need to sell "in depth" because their capacity was limited. Today, they're marshaling all their resources and going beyond the

purchasing agents to the men who write requisitions—designers, stylists, engineers, and operating people.

• **Winning Acceptance**—Testifying to the effectiveness of steel industry promotional efforts are two developments that have spurred the growth of high strength steel markets: 1. Use of higher design stresses. Code bodies are ultraconservative, but there has been a tendency for them to approve designs at higher stress levels than have been customary. Designers have learned that they can use half the yield strength of quenched and tempered steel. 2. Acceptance of welded construction—especially in bridges. The ASTM recently came out with some specifications for boltable and weldable steels that are encouraging their use in bridges and buildings.

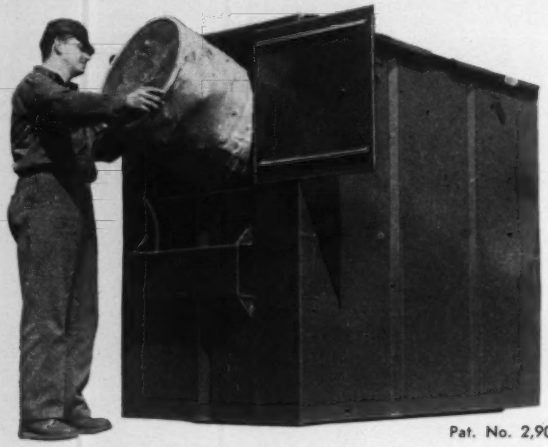
The next big breakthrough for the older high strength steels will be in commercial buildings, steelmakers believe. Traditionally, 33,000-psi-yield-strength A7 steel has been used in buildings. High strength steel permits significant over-all savings in costs. Case in point: In Chicago, use of U. S. Steel Corp.'s Man-Ten in columns of the first 23 stories of a 40 floor building at 1 Wacker Drive saved 25 per cent in the tonnage of the whole skeleton and some floor space.

• **"Family of Steels"**—Combining high strength and carbon steels in a commercial building may sound like a new idea, but it's nothing more than vertical application of a well ¡established bridge building principle. In California's Carquinez Straits bridge, completed in 1958, heavily stressed members were fabricated from 90,000 psi "T-1" steel, intermediate members used 50,000 psi A242, and lightly stressed members used 33,000 psi A373 (carbon) steel. Alloy steels reportedly made a saving of about $800,000 possible. The same principles were later applied to the design of the Benecia-Martinez and Whiskey Creek bridges, also in California.

In order of their importance, the major markets for high strength steels are: 1. Construction—buildings and bridges. 2. Industrial and construction equipment. (The first two categories account for about 50 per cent of the market.) 3. Freight cars and piggybacks (10 to 12 per cent of the market). 4. Automotive—passenger car bumpers, frame members for trucks, corner posts, and side panel sheets. 5. Shipboard containers. Steelmakers say the most promising new use for high strength steels is in construction (columns for buildings), but they also anticipate greater demand from ordnance (missile handling and group support equipment). U. S. Steel Corp. believes that unpainted Cor-Ten may be applied extensively in curtain wall construction, transmission towers, sign bridges, and highway light standards.

• **More "T-1" Coming**—Since its introduction in 1953, "T-1" steel has been in such demand that producers have operated continually at capacity. Unlike the 50,000 psi, high strength steels that get their physicals in the hot rolled state, "T-1" requires heat treating. Output has been limited by the availability of suitable equipment. In

How our small plant solved its waste disposal problem WITHOUT CAPITAL OUTLAY...



Pat. No. 2,900,096

DEMPSTER-DUMPMASTER Equipped Hauler Provides Containers and Service for Small Fee

Our small Midwestern manufacturing firm did not generate enough refuse to justify ownership of its own refuse disposal system. Yet, it was plagued by unsightly trash piles, fire hazards and scattered refuse in the plant yard.

Our plant engineer then heard of a DEMPSTER-DUMPMASTER equipped private hauler in the adjoining city. A survey revealed that two big-capacity refuse containers, placed one at each end of the plant, would handle the entire refuse accumulation.

The private hauler placed the containers, and a small monthly fee covered maintenance, labor, hauling and dumping refuse. No capital outlay was involved, disposal costs were reduced, and plant housekeeping was vastly improved.

In all major cities, private haulers who own DEMPSTER-DUMPMASTER equipment render fast, efficient, low-cost refuse storage and collection service. They place one or 100 containers at your service for a reasonable fee. A free brochure describes their service in detail.

Free Brochure and Name of Nearest Private Hauler on Request

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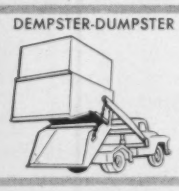


DEMPSTER DUMPMASTER®

EQUIPPED PRIVATE HAULERS

1957, U. S. Steel's Homestead (Pa.) Works brought on stream a continuous quenching and tempering line that could handle the product of its 160 in. plate mill. In the fall of 1959, it became apparent that greater capacity was needed, so a duplicate line was ordered. Now the corporation is planning a third line. It will handle the output of Homestead's 100 in. plate mill.

Other producers that have such heat treating equipment are Lukens Steel Co., Coatesville, Pa. (licensed by U. S. Steel to make "T-1"), Great Lakes Steel Corp., Detroit (producer of N-A-Xtra), and Armco Steel Corp.'s Sheffield Div., Houston.

By one estimate, the industry's usable commercial capacity for "T-1" type steels is about 250,000 tons a year. It's hard to figure because armor plates, ship plates, stainless, and regular carbon plates go through the same quench and temper lines that handle the high strength material.

• **No Foreign Threat** — Although the Germans and Japanese have been producing steels with a minimum yield strength of about 85,000 psi (using American built heat treating equipment), they're not making any serious inroads in the U. S. market. "T-1" is one of the few steels with which American fabricators can still compete successfully abroad on a cost and strength basis. Case in point: A U. S. fabricator recently vied with a foreign bidder for a structure to be erected in Europe. Even though the U. S. firm figured its bid on the basis of domestic "T-1" steel and fabricating costs, it won.

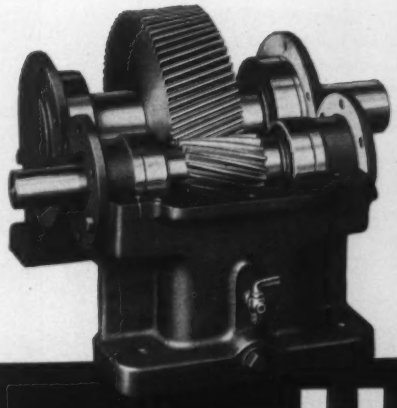
Sheets, Strip . . .

Sheet & Strip Prices, Pages 208 & 209

Sheetmakers are stocking hot and cold rolled bands to maintain their production rates and permit quicker shipments.

Where bands are available, hot sheets can be had within two to three weeks (even less in some cases) and cold sheets within three weeks. Where bands are not available, hot sheets can be had in three to four weeks, and cold sheets in five to six.

Galvanized sheets, one of the tighter products, are being offered



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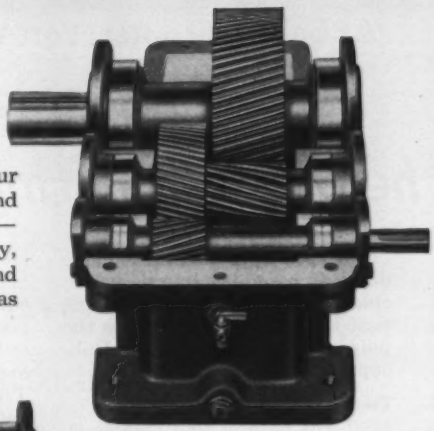

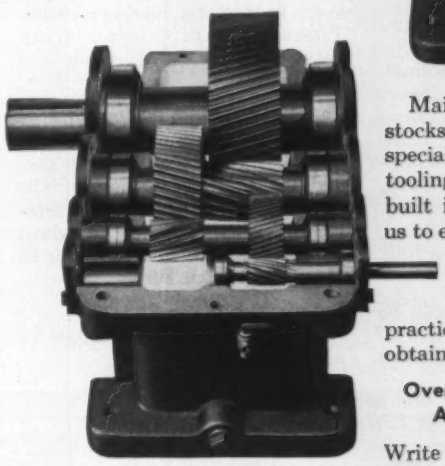

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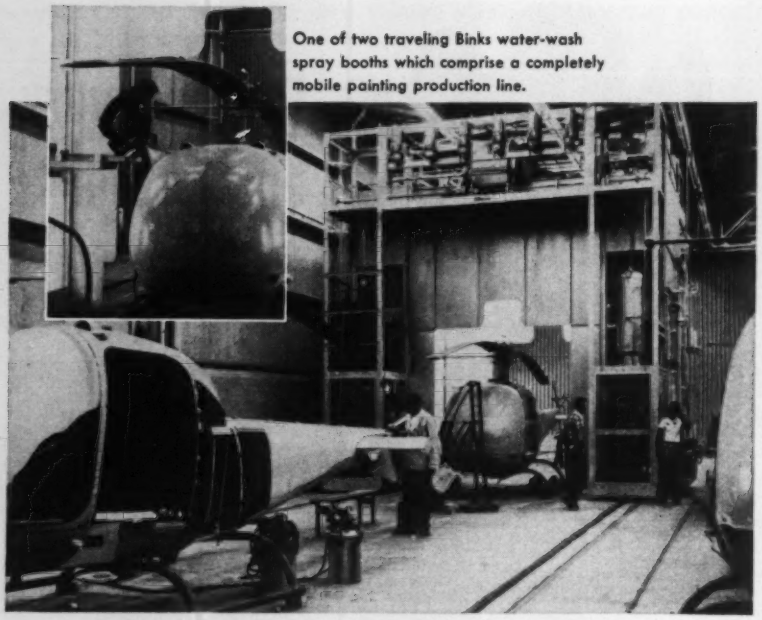

One of two traveling Binks water-wash spray booths which comprise a completely mobile painting production line.

At Bell Helicopter, Fort Worth, Texas...

traveling spray booths help cut painting time 80%

"Helicopters are difficult to move down an assembly line so we decided to move the assembly line past the helicopters," states the paint shop foreman at Bell Helicopter, Fort Worth, Texas.

Two traveling spray booths
With the help of Bell personnel, Binks spray finishing engineers developed two giant traveling spray booths mounted on rails. Each carries with it all the equipment needed for spray painting, from spray guns to air compressors. After a helicopter is painted, the booth moves down the line.

Clean air vented at ceiling
No fixed exhaust stack could be used with a traveling booth, so Binks engineers recommended the use of water-wash spray booths. The water-wash system completely traps overspray paint pigments and fumes so that air exhausted through louvered ducts in the room ceiling is clean. There is no pipe connection between the exhaust stack and the ducts.

Complete equipment line and design help available
Whether your need is for a special custom installation of the type reported here or an integrated system using standard components, it will pay you to check first with Binks.

Details in Bulletin 975
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for shipment in early July.

Most sheetmakers expect no appreciable pickup in buying before late next month. Demand for high carbon and alloy cold-finished strip specialties is slower. It had been holding up better than that for the medium and lower carbon grades. Most consumers are operating largely off inventories and will continue to do so until next quarter.

Vacuum Melting Extra Cut On Special Bearing Steel

Prices on a group of quality grade, tool steels used primarily for aircraft bearings were lowered last week by Allegheny Ludlum Steel Corp., Pittsburgh, through reduction of the extra charge for consumable electrode vacuum melting.

That extra on the company's Teton and other tool steel modifications of Alloy 52100, is reduced to 88 cents a pound from the previous level of $1 a pound. The change brings the price of representative billets of vacuum melted Teton tool steel in base quantities down to $1.02525 per pound from the previous price of $1.14525.

The reductions are in line with similar revisions made a month ago on other groups of vacuum melted, low alloy steels used primarily for jet aircraft and missile components.

Steel Bars . . .

Bar Prices, Page 207

Although demand is diversified, hot carbon bar business continues slow. Rolling schedules are less frequent as a result and most delivery promises are a little more extended, running three to four weeks.

Shipments of cold finished bars are easy; most converters have considerable hot stock on hand.

Wire . . .

Wire Prices, Pages 209 & 210

Wire specialty mills in New England have caught up with backlogs but finishing operations continue ahead of rod and semifinished steel production.

While the decline in wire buying is attributed largely to heavy inventories, there are also indications that consumption of some grades of manufacturers' wire, spring wire, cold heading wire, and specialties

is beginning to slide. One New England specialty mill is operating at 80 per cent of capacity (ingot production), but most producers are not operating anywhere near that rate.

Prestressed Strand Price Cut in Fight on Imports

Some domestic producers of prestressed strand have reduced prices in excess of 16 per cent on some major items (see price table on Page 210). The action was taken in an effort to recoup business lost to imports, particularly Japanese.

Indicative of the inroads being made by foreign steel, imports last year totaled around 21,000 tons, with 15,000 tons coming from Japan. The figure represents 42 to 43 per cent of the estimated 49,000 tons consumed during the year.

Hot Rolled Steel Capacity Reaches Record Level

Annual capacity for hot rolled sheets, bars, plates, structural shapes, rails, and other products now stands at 113,785,590 net tons annually, about 10.2 million tons more than in 1957, reports the American Iron & Steel Institute.

Per capita capacity of finished products now is 1273 lb vs. 1220 in 1957. Since 1948, hot rolled capacity per capita has increased 24 per cent.

Thirty-one states now have hot rolling facilities compared with 29 in 1957. The newcomers are Florida and Hawaii, each with 45,000 tons of bar capacity.

Ohio added more than 1.7 million net tons to its hot rolling capacity between 1957 and 1960, to lead all other states. The next largest increases were in Pennsylvania, Indiana, Maryland, Illinois, Michigan, and California—in that order. Those seven among the top ten states each added more than 1 million tons of capacity. Michigan and California improved their rank over 1957.

Tubular Goods . . .

Tubular Goods Prices, Page 211

Oil country goods producers are shipping at 20 to 25 per cent of capacity, and much of the tonnage

Traveling fume hood follows the ladle...

for leaded steel production

AT JONES & LAUGHLIN STEEL CORP.

Toxic lead oxide fumes, inherent to the leaded steel manufacturing process, are now controlled effectively with a traveling hood car system (1), developed by KIRK & BLUM.

Orifice of exhaust system is just inches away from the pouring action (2). Toxic gas, formed in the ingot mold, is baffled by the ladle bottom, (3), to assist positive horizontal cross-flow at high velocity over the top of the molds.

The hood connects to a slotted exhaust manifold, (4), equipped with flexible sealing surfaces. Synchronized with the ladle crane, the car indexes freely along the pouring platform, opening the flexible sealing surfaces only at the point of contact to produce suction through the intake orifice for fume removal in the area of pouring.

This unique design is a product of KIRK & BLUM engineering ingenuity. Put this know-how to work for you. For further details or a no-obligation fume control survey, write: The Kirk & Blum Manufacturing Co., 3226 Forrer Street, Cincinnati 9, Ohio.

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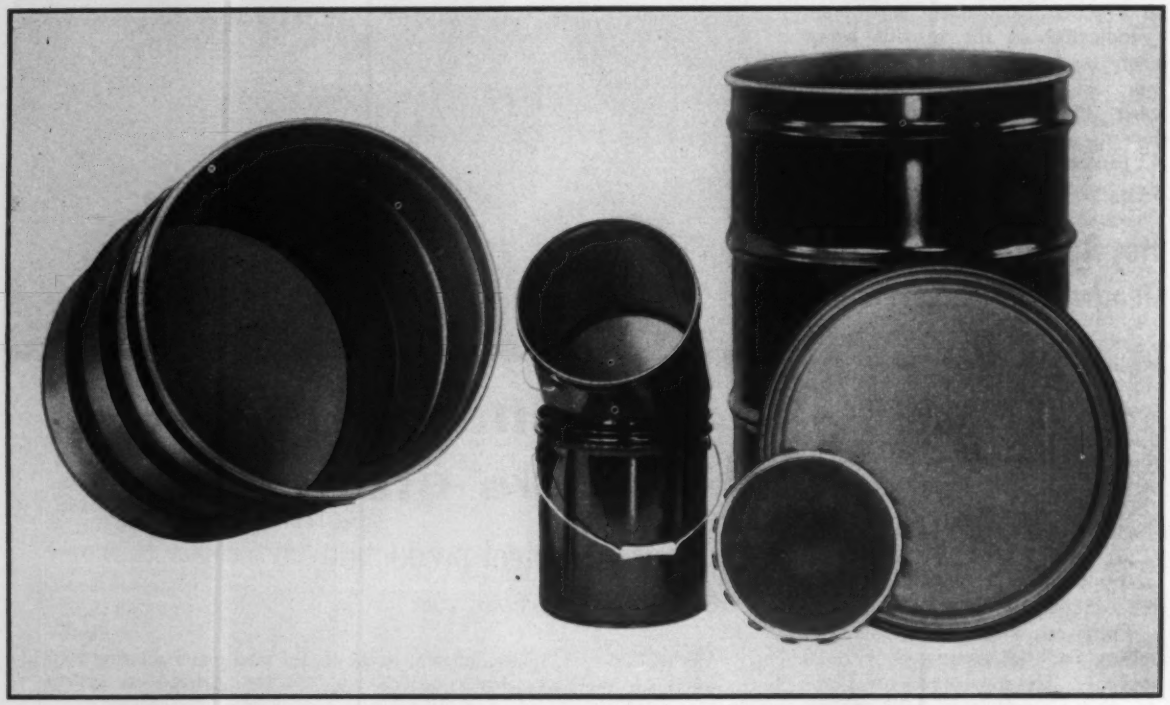


HERESITE PURE PHENOLIC LININGS ARE DECLARED SAFE FOR FOOD CONTAINERS

**By The Department of Health, Education and Welfare—
Food and Drug Administration, Washington, D. C., and
The United States Department of Agriculture
Meat Inspection Division, Washington, D. C.**

HERESITE & CHEMICAL COMPANY

**Main Office & Plant—Manitowoc, Wisconsin
Eastern Division—Garwood, New Jersey
General Coating, Inc.—Woodbridge, New Jersey (subsidiary)**

***Canada: Dominion Rubber Company, Ltd.
Montreal, Quebec***

***Europe: Aluminium-Schweisswerk A. G.
Schlieren-Zurich, Switzerland***

is going to downriver terminals. There's little likelihood of a business upturn until the fall.

With the petroleum market glutted, oil companies are cutting their refinery runs and reducing exploration. In an effort to trim costs, they have adopted austerity programs and are liquidating their steel inventories. Tubemakers have made it easy for them by carrying bigger mill inventories of semifinished and finished goods than ever before, and by agreeing to stock every size they might need at a multitude of shipping points in the Southwest.

Service Center Quantity Extras Cut on Small Lots

Competitive market conditions are reflected in quantity extra schedule revisions by leading steel service centers. Last week, Joseph T. Ryerson & Son Inc. revised downward its schedule on small quantities of hot rolled products (bars, plates, sheets, and structurals), and on galvanized and cold rolled sheets.

Other leading service centers are reported taking similar action to remain competitive.

The reductions in the schedule, which, in effect, cut prices $1.25 to $2.25 per 100 lb on quantities of less than 400 lb, became effective at Ryerson's Pittsburgh and Chicago plants June 1, and will go into effect at its other plants shortly.

Under the company's new schedule, the $3 per 100 lb extra for items 100 to 399 lb, and the $4 per 100 lb extra for items under 100 lb (in total orders of 20,000 lb and over) have been eliminated; both quantities now command the same item extra that applies on quantities under 1000 lb, $1.75 per 100 lb.

Ryerson officials point out that since introduction of its quantity schedule in May, 1959, various minor adjustments have been made to reflect cost studies and marketing experience. The current revisions, however, reflect competitive conditions rather than cost reductions; the $3 and $4 per 100 lb extras formerly applied on the small lots were less than the cost of handling.

It's indicated that the revised quantity extra schedule will shave profits considerably, especially during low business volume.

Tool Steel . . .

Tool Steel Prices, Page 211

While there was a small post-strike flurry of orders for tool steel, peak demand didn't last nearly as long as it did in the carbon steel products. Consumers didn't have to do much inventory rebuilding because they received shipments throughout the strike from producers who were'nt shut down. Orders declined from March to June. They have stabilized at a low level.

Business is better than it was at this time in 1958, but it is not as good as it was a year ago, when many buyers were hedging against the threatened steel strike. Last month, one of the leading producers shipped at about 60 per cent of capacity.

Market analysts predict tool steel industry shipments this year will run 100,000 to 110,000 tons. They say it takes 125,000 tons to make a "really good year."

Distributors . . .

Prices, Page 212

Because of sharp competition, steel service centers in the Philadelphia district have reduced prices on hot rolled sheets, bars, strip, structurals, and plates.

Bookings are expected to decline again this month and in July, due mainly to vacation shutdowns. Part of the business lag is attributed to a continuation of stock liquidation.

Mansbach Steel Co., Ashland, Ky., is broadening its stocking of clad steel plates. A warehouse has been built as part of the expansion program.

Plates . . .

Plate Prices, Page 207

No noticeable change is reported in the plate market. Demand continues slow with little variation either way. One maker says power generating equipment needs may be a little better, reflected in a slight quickening in sheared plates and specialties. Fabricators' backlogs are light; their steel intake has raised their inventories to higher than normal levels.

Plate girder estimating is slightly heavier in New England. Weldment shops report spotty backlogs, and most of them are depending on their steel inventories, buying only fill-in tonnage. Several large contracts for submarines have been placed in the East. Tank volume continues to lag. Demand for pressure vessels and specialties is holding up better than that for straight carbon steel structures.

Sheared plate deliveries range two to four weeks, alloy plate and other specialties, three to seven weeks.

Structural Shapes . . .

Structural Shape Prices, Page 207

Structural steel demand is disappointing. Fabricators are steadily eating into their backlogs, and are cutting bids to a nonprofitable level in some cases, seeking to book new business so as to sustain operations at a fair level. New inquiry is diversified but projects are generally small.

Bridge contracts for fabricated structural steel are slightly heavier in New England, but shops are placing orders for plain material to match bookings, and part of requirements are coming from inventories. Price competition is sharpest on jobs of 300 tons and less.

Shape deliveries are tighter for the reason the mills can't accumulate tonnage fast enough to maintain normal rolling schedules. If lucky in catching an early rolling, fabricators can get deliveries within a week, but usually shipments take three to four weeks.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

41,000 tons, suspension bridge, Tagus River, Portugal, to U. S. Steel Export Co., New York, for fabrication by American Bridge Div., U. S. Steel Corp., Pittsburgh; 12,000 tons will be of high strength, low alloy steel; main cables and suspenders will weigh about 9000 tons, and about 7000 tons of steel will be required for foundations. The structure will be the largest suspension bridge in Europe and will rank fifth in the world. Plans were prepared for U. S. Steel Export by B. D. Steinman, New York. Main towers will be spaced about 3320 ft apart, and the two side spans will measure close to 1540 ft. Towers will rise about 755 ft above solid rock. Including the approach viaducts, the length of the bridge will be about 1.9 miles. A system of access roads will extend the over-all length of the project to some 8.1 miles.

2230 tons, 25 span state highway bridge, over Route 67, Seymour, Conn., to Phoenix Bridge Co., Phoenixville, Pa.; L. G. DeFelice & Sons Inc., North Haven, Conn., general contractor; 502 tons, steel piles, to Bethlehem Steel Co., Bethlehem, Pa.

1025 tons, three, 3 span and two, 1 span composite wide flange beam bridges, Waterbury, Vt., Waterbury-Bolton Contract No. 1, interstate Route 89, to American Bridge Div., U. S. Steel Corp., Pittsburgh; Landers & Griffin Inc., Portsmouth, N. H., and Morrison-Knudsen Co. Inc., New York, joint general contractors.

1300 tons, assembly plant, General Motors Corp., Wilmington, Del., to Belmont Iron Works, Eddystone, Pa.

1000 tons, addition to pulp plant of Rayonier Inc., Hoquiam, Wash., to Isaacson Iron Works, Seattle.

705 tons, one, 6 span, one, 5 span, and one, 1 span composite wide flange beam bridges, Bolten, Conn., Waterbury-Bolton contract No. 3, interstate Route 89, to American Bridge Div., U. S. Steel Corp., Pittsburgh; Landers & Griffin Inc., Portsmouth, N. H., and Morrison-Knudsen Co. Inc., New York, joint general contractors.

415 tons, three state highway bridges, Old Lyme, Conn., to F. L. McDermott Co., New Haven, Conn.; Zaist Bros., Chesterfield, Conn., general contractor; 235 tons, steel piles, to Bethlehem Steel Co., Bethlehem, Pa.

650 tons, structurals and reinforcing bars, county courthouse, Miami, Fla., to Sheffield Steel Co., Birmingham (structurals) and Joseph H. Fox Co., Birmingham (reinforcing bars); Edward M. Fleming Construction Co., Miami, general contractor.

350 tons, sections, Jones Falls Expressway, Baltimore, through Kaufman Construction Co., Philadelphia, to Phoenix Bridge & Iron Works, Phoenixville, Pa.

295 tons, two, 3 span wide flange state highway bridges, Waterbury-Bolton, Vt., contract No. 2, to Vermont Structural Steel Co., Burlington, Vt.; Lane Construction Co., Meriden, Conn., general contractor; 110 tons, steel piles, to Bethlehem Steel Co., Bethlehem, Pa.

233 tons, including 65 tons of reinforcing bars, Kelley Rd. bridge, Orono, Maine, to Bancroft & Martin Rolling Mills Co., South Portland, Maine; H. B. Fleming Inc., South Portland, Maine, general contractor.

235 tons, four span, plate girder bridge, Farmington River, New Hartford-Canton, Conn., to City Iron Works, Wethersfield, Conn.; White Oak Excavators Inc., Plainville, Conn., general contractor.

223 tons, 3 span welded girder bridge, Hopkinton-Everett Reservoir, New Hampshire, to Lyons Steel Co., Manchester, N. H.; Theodore Loranger & Sons, New Bedford, Mass., general contractor; 65 tons of concrete reinforcing bars to Plantations Steel Co., Providence, R. I.

160 tons, including 45 tons, concrete reinforcing bars, Forest Ave. Bridge, Orono, Maine, to Bancroft & Martin Rolling Mills, South Portland, Maine; Reed & Reed, Woolwich, Maine, general contractor.

159 tons, two state bridges, North Haven, Conn., to American Bridge Div., U. S. Steel Corp., Pittsburgh; Brunalli Construction Co., Southington, Conn., general contractor.

STRUCTURAL STEEL PENDING

11,000 tons, state highway project, Bronx County, New York, bids June 23.

4000 tons, additional terminal facilities, La-Guardia Airport, Queens, N. Y., bids postponed until June 15; Turner Construction Co., New York, general contractor.

2364 tons, 95 steel towers and footings, government furnished, Rocky Reach-Maple Valley 21.4 mile transmission line; Charles T. Parker Construction Co., Portland, Oreg., low at $888,993 for erection, to Bonneville Power Administration, Portland.

2004 tons, 75 steel towers and footings, government furnished, Rocky Reach-Maple Valley transmission line; bids for erection to Bonneville Power Administration, Portland, Oreg., June 14.

665 tons, two state highway bridges, relocation Route 63, Naugatuck, Conn.; also 512 tons of steel piles, and 235 tons of reinforcing bars.

600 tons, Portland State College classroom; Oscar R. Wayman, Portland, Oreg., low at $1,232,800 to the Board of Education.

500 tons, Public School 288, Brooklyn, N. Y., bids June 16.

500 tons, Public School 183, Queens, N. Y., bids June 16.

335 tons, four, 3 span bridges, Salem, N. H.; M. DeMatteo Construction Co., Quincy, Mass., low on the general contract; also 215 tons of reinforcing bars and 250 tons of steel piles.

320 tons, Graham Hill School, Seattle; general contract to Dahlgren Construction Co., Seattle, at $372,948.

245 tons, Public School 232, Queens, N. Y., bids June 16.

200 tons, estimated, state bridgework, Saratoga County, New York, bids June 23.

200 tons, city bridgework, Elmira, N. Y., bids closed.

120 tons, Sheep Creek Bridge, Alaska; Green Construction Co., Fairbanks, Alaska, low at $323,875.

120 tons, reservoir cover, Tacoma, Wash.; bids in.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1165 tons, 25 span state highway bridge over Route 67, Seymour, Conn., to Bethlehem Steel Co., Bethlehem, Pa., L. G. DeFelice & Sons Inc., North Haven, Conn., general contractor; 245 tons, mat reinforcement (mesh) to American Steel & Wire Div., U. S. Steel Corp., Cleveland.

235 tons, early warning facilities, Shemya, Alaska, to Pacific Coast Div., Bethlehem Steel Co. Seattle; McLaughlin Co., general contractor.

220 tons, post office-courthouse, Martinsburg, W. Va., to Brocker Mfg. & Supply Co., York, Pa.; Thorington Construction Co., Richmond, Va., general contractor; structural steel to Montague-Betts Co. Inc., Lynchburg, Va.

215 tons, three state highway bridges, Lynnfield-Wakefield, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; Coleman Bros. Corp., Readville, Mass., general contractor.

210 tons, two, 3 span wide flange beam bridges, Waterbury-Bolton, Vt., contract No. 2, to Scherer Steel Co., East Hartford, Conn.; Lane Construction Co., Meriden, Conn., general contractor.

203 tons, early warning facilities, Nicolski, Alaska, to Pacific Coast Div., Bethlehem Steel Co., Seattle; Premier Co., general contractor.

150 tons, three state highway bridges, Old Lyme, Conn., to City Iron Works, Wethersfield, Conn.; Zaist Bros., Chesterfield, Conn., general contractor.

REINFORCING BARS PENDING

185 tons, Idaho State, two highway bridges, Payette-Canyon counties; Hoops Construction Co., Twin Falls, Idaho, low at $1,126,574.

100 tons, Washington State overspan, King County; bids to Olympia, Wash., June 21.

PLATES . . .

PLATES PLACED

1000 tons or more, penstocks and surge tanks, Oahe Reservoir, near Pierre, S. Dak., to Graver Tank & Mfg. Co., division of Union Tank Car Co., and Knapp Engineering Div., Western Machinery Co., joint venture, $8,094,200.

418 tons, Navy, General Stores Supply Office, Philadelphia (three contracts), to U. S. Steel Corp., Pittsburgh.

130 tons, corrosion resisting, Navy, General Stores Supply Office, Philadelphia, to Ingersoll Steel Div., Borg-Warner Corp., Chicago (70); Jessop Steel Co., Washington, Pa., (43), and Caine Steel Co., Chicago (17).

PLATES PENDING

1400 tons, Tolt River water supply project, Seattle, 54 in. line; Valley Construction Co. and Morrison-Knudsen Co., Seattle, joint bid for steel $837,933 apparently low; General Construction Co., Seattle, $933,871 for concrete cylinder.

450 tons, municipal watertank, Ellensburg, Wash.; bids in.

200 tons, 450 ft, 60 in. waterline; bids to Tacoma, Wash., June 13.

200 tons, tanks for expanded Rayonier Inc., plant, Hoquiam, Wash.; pending.

RAILS, CARS . . .

RAILROAD CARS PLACED

Chicago, Milwaukee, St. Paul & Pacific, 40 double-deck suburban passenger cars to the Budd Co., Philadelphia, costing $7 million.

RAILROAD CARS PENDING

Western Pacific, 24 boxcars, bids asked.

Pakistan, 20 broad gage and 60 meter gage railway cars, bids July 11. Specifications are available on loan from the Trade Development Div., Bureau of Foreign Commerce, U. S. Department of Commerce, Washington 25, D. C.

United Arab Republic, 13 electric cars, for the Cario Electric Railway and Heliopolis Oases Co., bids Sept. 1. Specifications are available on loan from the Trade Development Div., Bureau of Foreign Commerce, U. S. Department of Commerce, Washington 25, D. C.

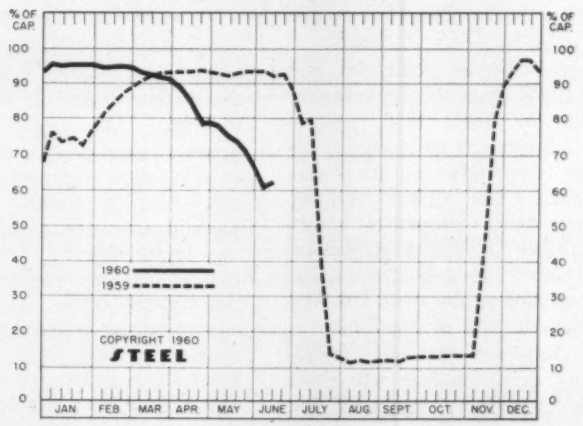
DISTRICT INGOT RATES

(Percentage of capacity utilized)

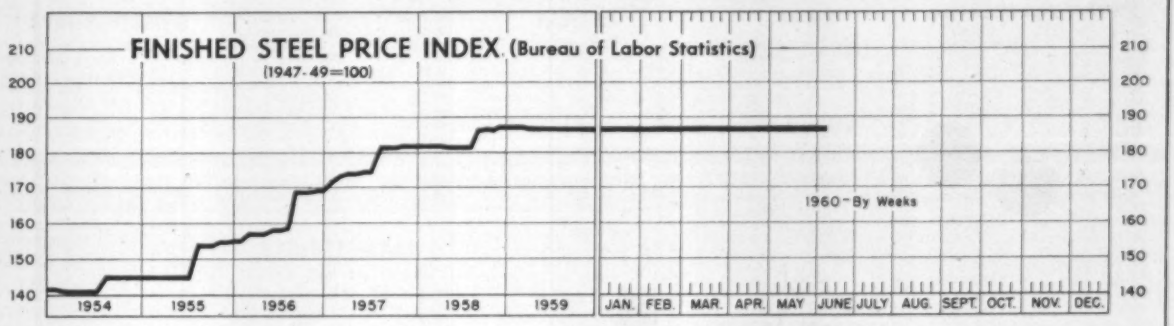
	Week Ended June 12	Week Ago	Month Ago	Year Ago
Northeastern	68	64	77	97
Buffalo	61	69	77	96
Pittsburgh	62	61	75	94
Youngstown	40	27	50	88
Cleveland	65	64	78	89
Detroit	83	81	99	97
Chicago	64	68	76	90
Cincinnati	64	60	88	84
St. Louis	80	77	80	96
Southern	61	54	73	93
Western	67	63	70	90
Total Industry	62.3	60.6	73.8	92.0
Index (1947-49=100)	110.5	107.4	130.9	162.1
Net Tons (In thousands)	1,775	1,726	2,102	2,604

Current week's figures are preliminary. Weekly capacity (net tons): 2,849,306 in 1960 and 2,831,331 in 1959. Source: American Iron & Steel Institute.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



June 7, 1960	Week Ago	Month Ago	May Index	Year Ago
186.7	186.7*	186.8	186.8	186.7

*Revised.

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended June 7

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825
Rails, Light, 40 lb	7.292
Tie Plates	6.875
Axles, Railway	10.175
Wheels, Freight Car, 33 in. (per wheel)	62.000
Plates, Carbon	6.350
Structural Shapes	6.167
Bars, Tool Steel, Carbon (lb)	0.560
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400
Bars, Tool Steel, H.R. Alloy, High Speed, W18 Cr 4, V 1 (lb)	1.895
Bars, H.R., Alloy	10.775
Bars, H.R., Stainless, 303 (lb)	0.543
Bars, H.R., Carbon	6.675
Bars, Reinforcing	6.385
Bars, C.F., Carbon	10.710
Bars, C.F., Alloy	14.125
Bars, C.F., Stainless, 302 (lb)	0.570
Sheets, H.R., Carbon	6.350
Sheets, C.R., Carbon	7.300
Sheets, Galvanized	8.765
Sheets, C.R., Stainless, 302 (lb)	0.658
Sheets, Electrical	12.625
Strip, C.R., Carbon	9.489
Strip, C.R., Stainless, 430 (lb)	0.480
Strip, H.R., Carbon	6.250
Pipe, Black, Buttweld (100 ft)	19.905
Pipe, Galv., Buttweld (100 ft)	23.585
Pipe, Line (100 ft)	199.533
Casing, Oil Well, Carbon (100 ft)	201.080
Casing, Oil Well, Alloy (100 ft)	315.213
Tubes, Boiler (100 ft)	51.200
Tubing, Mechanical, Carbon (100 ft)	27.005
Tubing, Mechanical, Stainless, 304 (100 ft)	205.608
Tin plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
Black Plate, Canmaking Quality (95 lb base box)	7.900
Wire, Drawn, Carbon	10.575
Wire, Drawn, Stainless, 430 (lb)	0.665
Bale Ties (bundles)	7.647
Nails, Wire, 8d Common	9.530
Wire, Barbed (80-rod spool)	8.414
Woven Wire Fence (20-rod roll)	20.083

STEEL's FINISHED PRICE INDEX*

	June 8 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	194.53
Index in cents per lb	6.713	6.713	6.713	6.713	5.270

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$118.45
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	56.54
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	56.04
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	57.27
Steelmaking Scrap, GT	31.33	32.00	33.33	34.00	35.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	June 8 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.30
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.30
Bars, H.R., deld., Philadelphia	5.975	5.975	5.975	5.975	4.55
Bars, C.R., Pittsburgh	7.65*	7.65*	7.65*	7.65*	5.40
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.25
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.25
Shapes, deld., Philadelphia	5.77	5.77	5.77	5.77	4.53
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.225
Plates, Chicago	5.30	5.30	5.30	5.30	4.225
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.225
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.225
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.225
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.10
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.45
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	5.75
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	5.85
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	5.90
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	5.75
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	6.85
Tin plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.05

*Including 0.35c for special quality.

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$78.00
Wire rods, ⅜-⅝" Pitts.	6.40	6.40	6.40	6.40	4.675

PIG IRON, Gross Ton	June 8 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$57.00
Basic, Valley	66.00	66.00	66.00	66.00	56.00
Basic, deld., Philadelphia	70.41	70.41	70.41	70.41	59.66
No. 2 Fdry, Neville Island, Pa.	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	53.16
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	52.88
No. 2 Fdry (Birm.), deld., Cin.	70.20	70.20	70.20	70.20	60.58
Malleable, Valley	66.50	66.50	66.50	66.50	56.50
Malleable, Chicago	66.50	66.50	66.50	66.50	56.50
Ferromanganese, net tons†	245.00	245.00	245.00	245.00	190.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$30.50	$30.50	$33.50	$35.50	$34.50
No. 1 Heavy Melt, E. Pa.	34.00	35.00	35.00	35.00	36.50
No. 1 Heavy Melt, Chicago	29.50	30.50	31.50	35.00	34.00
No. 1 Heavy Melt, Valley	32.50	32.50	35.50	39.50	34.50
No. 1 Heavy Melt, Cleve.	31.50	31.50	32.50	36.50	31.50
No. 1 Heavy Melt, Buffalo	30.50	30.50	30.50	33.50	29.50
Rails, Reolling, Chicago	49.50	52.50	52.50	58.50	51.50
No. 1 Cast, Chicago	42.50	42.50	42.50	50.50	40.50

COKE, Net Ton					
Beehive, Furn., Connisvl.	$15.00	$15.00	$15.00	$15.00	$13.75
Beehive, Fdry., Connisvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	25.25

• specify • specify

set your line with extra sales bait

TI-CO® NON-FLAKING GALVANIZED SHEETS

for COST SAVINGS

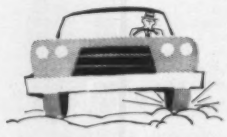
With today's squeeze between manufacturing cost and a selling price that moves products with satisfactory profit, every production saving deserves careful consideration. That's why many manufacturers are using Inland TI-CO galvanized sheets to more economically provide corrosion resistance for their product. ■ Many times TI-CO can be substituted for more expensive materials. TI-CO can eliminate the need for protective painting . . . often is less expensive. Or, if in your processing you normally form and then pot-dip production parts, this costly step can be eliminated by simply forming the part with the galvanized sheet that takes the toughest fabricating, yet won't chip, peel, crack or flake . . . TI-CO. You'll add extra "sales bait" at the purchaser's level too!

INLAND STEEL COMPANY 30 West Monroe Street · Chicago 3, Illinois Sales Offices: *Chicago · Davenport · Detroit Houston · Indianapolis · Kansas City · Milwaukee · New York · St. Louis · St. Paul*

INLAND

Garage door maker saved costs of pot-dipping zinc coated steel rails and hardware when he switched to non-flaking TI-CO.

Manufacturer of milk cases obtained corrosion resistance and increased strength at reduced cost when he substituted non-flaking TI-CO for more costly metal.



TI-CO eliminated painting of hot rolled steel and provided added corrosion resistance for auto wheel suspension component.

Steel Prices

Mill prices as reported to STEEL, June 8, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 208, footnotes, page 210.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 ....$76.00

INGOTS, Alloy (NT)
Detroit S41 ....$82.00
Economy,Pa. B14 ....82.00
Farrell,Pa. S3 ....82.00
Lowellville,O. S3 ....82.00
Midland,Pa. C18 ....82.00
Munhall,Pa. U5 ....82.00
Sharon,Pa. S3 ....82.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bartonville,Ill. K4 ....$82.00
Bessemer,Pa. U5 ....80.00
Buffalo R2 ....80.00
Clairton,Pa. U5 ....80.00
Ensley,Ala. T2 ....80.00
Fairfield,Ala. T2 ....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 ....80.00
Johnstown,Pa. B2 ....80.00
Lackawanna,N.Y. B2 ....80.00
Munhall,Pa. U5 ....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ....80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 ....80.00
Youngstown R2 ....80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$99.50
Buffalo R2 ....99.50
Canton,O. R2 ....102.00
Clairton,Pa. U5 ....99.50
Conshohocken,Pa. A3 ....104.50
Ensley,Ala. T2 ....99.50
Fairfield,Ala. T2 ....99.50
Farrell,Pa. S3 ....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 ....99.50
Geneva,Utah C11 ....99.50
Houston S5 ....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2 ....99.50
LosAngeles B3 ....109.00
Midland,Pa. C18 ....99.50
Munhall,Pa. U5 ....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 ....109.00
Sharon,Pa. S3 ....99.50
S.Chicago R2, U5, W14 ....99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ....109.00
Warren,O. C17 ....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ....$119.00
Bridgeport,Conn. C32 ....119.00
Buffalo R2 ....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3 ....126.00
Detroit S41 ....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 ....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 ....119.00
Houston S5 ....124.00
Ind.Harbor,Ind. Y1 ....119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2 ....119.00
LosAngeles B3 ....139.00
Lowellville,O. S3 ....119.00
Massillon,O. R2 ....119.00
Midland,Pa. C18 ....119.00
Munhall,Pa. U5 ....119.00
Owensboro,Ky. G8 ....119.00
Sharon,Pa. S3 ....119.00
S.Chicago R2,U5,W14 ....119.00
S.Duquesne,Pa. U5 ....119.00
Struthers,O. Y1 ....119.00
Warren,O. C17 ....119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 ....$122.50
Canton,O. R2 ....125.00
Cleveland R2 ....122.50
Gary,Ind. U5 ....122.50
S.Chicago,Ill. R2, W14 ....122.50
S.Duquesne,Pa. U5 ....122.50
Warren,O. C17 ....122.50

SKELP
Aliquippa,Pa. J5 ....5.05
Benwood,W.Va. W10 ....5.05
Ind.Harbor,Ind. Y1 ....5.05
Munhall,Pa. U5 ....5.05
Pittsburgh J5 ....5.05
Warren,O. R2 ....5.05
Youngstown R2, U5 ....5.05

WIRE RODS
AlabamaCity,Ala. R2 ....6.40
Aliquippa,Pa. J5 ....6.40
Alton,Ill. L1 ....6.60
Bartonville,Ill. K4 ....6.50
Buffalo W12 ....6.40
Cleveland A7 ....6.40
Donora,Pa. A7 ....6.40
Fairfield,Ala. T2 ....6.40
Houston S5 ....6.65
IndianaHarbor,Ind. Y1 ....6.40
Johnstown,Pa. B2 ....6.40
Joliet,Ill. A7 ....6.40
KansasCity,Mo. S5 ....6.65
Kokomo,Ind. C16 ....6.50
LosAngeles B3 ....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 ....6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 ....6.50
S.Chicago,Ill. R2, W14 ....6.40
SparrowsPoint,Md. B2 ....6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 ....6.50
Struthers,O. Y1 ....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. "S" Shapes
AlabamaCity,Ala. R2 ....5.50
Aliquippa,Pa. J5 ....5.50
Atlanta A11 ....5.70
Bessemer,Ala. T2 ....5.50
Bethlehem,Pa. B2 ....5.55
Birmingham C15 ....5.50
Clairton,Pa. U5 ....5.50
Fairfield,Ala. T2 ....5.50
Fontana,Calif. K1 ....6.30
Gary,Ind. U5 ....5.50
Geneva,Utah C11 ....5.50
Houston S5 ....5.60
Ind.Harbor,Ind. I-2, Y1 ....5.50
Johnstown,Pa. B2 ....5.55
Joliet,Ill. P22 ....5.50
KansasCity,Mo. S5 ....5.60
Lackawanna,N.Y. B2 ....5.55
Los Angeles B3 ....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 ....5.50
Niles,Calif. P1 ....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 ....6.25
Seattle B3 ....6.25
S.Chicago,Ill. U5, W14 ....5.50
S.SanFrancisco B3 ....6.15
Sterling,Ill. N15 ....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 ....5.50

Wide Flange
Bethlehem,Pa. B2 ....5.55
Clairton,Pa. U5 ....5.50
FontanaCalif. K1 ....6.45
IndianaHarbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ....5.55
Munhall,Pa. U5 ....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 ....5.50
Sterling,Ill. N15 ....5.50
Weirton,W.Va. W6 ....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 ....6.80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....6.90
Munhall,Pa. U5 ....6.80
S.Chicago,Ill. U5, W14 ....6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 ....8.05
Bessemer,Ala. T2 ....8.05
Bethlehem,Pa. B2 ....8.10
Clairton,Pa. U5 ....8.05
Fairfield,Ala. T2 ....8.05
Fontana,Calif. K1 ....8.85
Gary,Ind. U5 ....8.05
Geneva,Utah C11 ....8.05
Houston S5 ....8.15
Ind.Harbor,Ind. I-2, Y1 ....8.05
Johnstown,Pa. B2 ....8.10
KansasCity,Mo. S5 ....8.15
Lackawanna,N.Y. B2 ....8.10
LosAngeles B3 ....8.75
Munhall,Pa. U5 ....8.05
Seattle B3 ....8.80
S.Chicago,Ill. U5, W14 ....8.05
S.SanFrancisco B3 ....8.75
Sterling,Ill. N15 ....7.75
Struthers,O. Y1 ....8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 ....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ....8.10
Munhall,Pa. U5 ....8.05
S.Chicago,Ill. U5 ....8.05
Sterling,Ill. N15 ....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ....5.55
Munhall,Pa. U5 ....5.50
S.Chicago,Ill. I-2, U5 ....5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ....6.50
Munhall,Pa. U5 ....6.50
S.Chicago,Ill. I-2, U5 ....6.50
Weirton,W.Va. W6 ....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ....5.30
Aliquippa,Pa. J5 ....5.30
Ashland,Ky.(15) A10 ....5.30
Atlanta A11 ....5.50
Bessemer,Ala. T2 ....5.30
Clairton,Pa. U5 ....5.30
Claymont,Del. C22 ....5.30
Cleveland J5, R2 ....5.30
Coatesville,Pa. L7 ....5.30
Conshohocken,Pa. A3 ....5.30
Ecorse,Mich. G5 ....5.30
Fairfield,Ala. T2 ....5.30
Farrell,Pa. S3 ....5.30
Fontana,Calif.(30) K1 ....6.10
Gary,Ind. U5 ....5.30
Geneva,Utah C11 ....5.30
GraniteCity,Ill. G4 ....5.40
Harrisburg,Pa. P4 ....5.30
Houston S5 ....5.40
Ind.Harbor,Ind. I-2, Y1 ....5.30
Johnstown,Pa. B2 ....5.30
Lackawanna,N.Y. B2 ....5.30
Mansfield,O. E6 ....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 ....5.30
Newport,Ky. A2 ....5.30
Pittsburgh J5 ....5.30
Riverdale,Ill. A1 ....5.30
Seattle B3 ....6.20
Sharon,Pa. S3 ....5.30
S.Chicago,Ill. U5, W14 ....5.30
SparrowsPoint,Md. B2 ....5.30
Sterling,Ill. N15 ....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 ....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ....7.05
Fontana,Calif. K1 ....7.85
Geneva,Utah C11 ....7.05
Houston S5 ....7.15
Johnstown,Pa. B2 ....7.05
SparrowsPoint,Md. B2 ....7.05

PLATES, Wrought Iron
Economy,Pa. B14 ....14.10

PLATES, H.S., L.A.
Aliquippa,Pa. J5 ....7.95
Ashland,Ky. A10 ....7.95
Bessemer,Ala. T2 ....7.95
Clairton,Pa. U5 ....7.95
Claymont,Del. C22 ....7.95
Cleveland J5, R2 ....7.95
Coatesville,Pa. L7 ....7.95
Conshohocken,Pa. A3 ....7.95
Economy,Pa. B14 ....7.95
Ecorse,Mich. G5 ....7.95
Fairfield,Ala. T2 ....7.95
Farrell,Pa. S3 ....7.95
Fontana,Calif.(30) K1 ....8.75
Gary,Ind. U5 ....7.95
Geneva,Utah C11 ....7.95
Houston S5 ....8.05
Ind.Harbor,Ind. I-2, Y1 ....7.95
Johnstown,Pa. B2 ....7.95
Munhall,Pa. U5 ....7.95
Pittsburgh J5 ....7.95
Seattle B3 ....8.85
Sharon,Pa. S3 ....7.95
S.Chicago,Ill. U5, W14 ....7.95
SparrowsPoint,Md. B2 ....7.95
Warren,O. R2 ....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy
Aliquippa,Pa. J5 ....7.50
Claymont,Del. C22 ....7.50
Coatesville,Pa. L7 ....7.50
Economy,Pa. B14 ....7.50
Farrell,Pa. S3 ....7.50
Fontana,Calif. K1 ....8.30
Gary,Ind. U5 ....7.50
Houston S5 ....7.60
Ind.Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 ....7.50
Lowellville,O. S3 ....7.50
Munhall,Pa. U5 ....7.50
Newport,Ky. A2 ....7.50
Pittsburgh J5 ....7.50
Seattle B3 ....8.40
Sharon,Pa. S3 ....7.50
S.Chicago,Ill. U5, W14 ....7.50
SparrowsPoint,Md. B2 ....7.50
Youngstown Y1 ....7.50

FLOOR PLATES
Cleveland J5 ....6.375
Conshohocken,Pa. A3 ....6.375
Ind.Harbor,Ind. I-2 ....6.375
Munhall,Pa. U5 ....6.375
Pittsburgh J5 ....6.375
S.Chicago,Ill. U5 ....6.375

PLATES, Ingot Iron
Ashland c.l.(15) A10 ....5.55
Ashland l.c.l.(15) A10 ....6.05
Cleveland c.l. R2 ....6.05
Warren,O. R2 ....6.05

BARS

BARS, Hot-Rolled Carbon
(Merchant Quality)
Ala.City,Ala.(9) R2 ....5.675
Aliquippa,Pa.(9) J5 ....5.675
Alton,Ill. L1 ....5.875
Atlanta(9) A11 ....5.875
Bessemer,Ala.(9) T2 ....5.675
Birmingham(9) C15 ....5.675
Buffalo(9) R2 ....5.675
Canton,O.(23) R2 ....6.15
Clairton,Pa.(9) U5 ....5.675
Cleveland(9) R2 ....5.675
Ecorse,Mich.(9) G5 ....5.675
Emeryville,Calif. J7 ....6.425
Fairfield,Ala.(9) T2 ....5.675
Fairless,Pa.(9) U5 ....5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 ....5.675
Houston(9) S5 ....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2..5.675
Joliet,Ill. P2 ....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
LosAngeles(9) B3 ....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa.(23) C18 ..6.025
Milton,Pa. M18 ....5.825
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 ....6.375
Owensboro,Ky.(9) G8 ..6.025
Pittsburg,Calif.(9) C11..6.375
Pittsburgh(9) J5 ....5.675
Portland,Oreg. O4 ....6.425
Riverdale,Ill.(9) A1 ..5.675
Seattle(9) A24,B3,N15..6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ....5.775
Struthers,O.(9) Y1 ....5.675
Tonawanda,N.Y. B12 ..5.675
Torrance,Calif.(9) C11 ..6.375
Warren,O. C17 ....6.025
Youngstown(9) R2,U5..5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 ....6.725
Bethlehem,Pa. B2 ....6.725
Bridgeport,Conn. C32 ....6.80
Buffalo R2 ....6.725
Canton,O. R2, T7 ....6.725
Clairton,Pa. U5 ....6.725
Detroit S41 ....6.725
Economy,Pa. B14 ....6.725
Ecorse,Mich. G5 ....6.725
Fairless,Pa. U5 ....6.875
Farrell,Pa. S3 ....6.725
Fontana,Calif. K1 ....7.775
Gary,Ind. U5 ....6.725
Houston S5 ....6.975
Ind.Harbor,Ind. I-2, Y1 6.725
Johnstown,Pa. B2 ....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ..6.725
LosAngeles B3 ....7.775
Lowellville,O. S3 ....6.725
Massillon,O. R2 ....6.725
Midland,Pa. C18 ....6.725
Owensboro,Ky. G8 ....6.725
Pittsburg J5 ....6.725
Sharon,Pa. S3 ....6.725
S.Chicago R2, U5, W14..6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 ....6.725
Warren,O. C17 ....6.725
Youngstown U5 ....6.725

BARS & SMALL SHAPES, H.R.
High-Strength, Low-Alloy
Aliquippa,Pa. J5 ....8.30
Bessemer,Ala. T2 ....8.30
Bethlehem,Pa. B2 ....8.30
Clairton,Pa. U5 ....8.30
Cleveland R2 ....8.30
Ecorse,Mich. G5 ....8.30
Fairfield,Ala. T2 ....8.30
Fontana,Calif. K1 ....9.00
Gary,Ind. U5 ....8.30
Houston S5 ....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 ....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. B2 ....8.30
LosAngeles B3 ....9.00
Pittsburgh J5 ....8.30
Seattle B3 ....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 ....9.05
Struthers,O. Y1 ....8.30
Youngstown U5 ....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 ....5.925
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
Sterling,Ill. N15 ....5.775
Sterling,Ill.(1) N15 ....5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 ....5.675
Atlanta A11 ....5.875
Joliet,Ill. P22 ....5.675
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 ....6.375
Pittsburgh J5 ....5.675
Portland,Oreg. O4 ....6.425
SanFrancisco S7 ....6.52
Seattle B3 ....6.425

BAR SIZE ANGLES; S. SHAPES
Wrought Iron
Economy,Pa. B14 ....16.45

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 ....6.80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 ....6.80
Youngstown U5 ....6.80

BARS, C.F. Loaded
(Including loaded extra)
Carbon
LosAngeles P2, S30 ..11.75*

Alloy
Ambridge,Pa. W18 ...10.175
BeaverFalls,Pa. M12..10.175
Camden,N.J. P13 ....10.35
Chicago W18 ....10.175
Elyria,O. W8 ....10.175
Monaca,Pa. S17 ....10.175
Newark,N.J. W18 ....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12,R2..7.65
Birmingham C15 ....8.25
Buffalo B5 ....7.70
Camden,N.J. P13 ....8.10
Carnegie,Pa. C12 ....7.65
Chicago W18 ....7.65
Cleveland A7, C20 ....7.65
Detroit B5, P17 ....7.85
Detroit S41 ....7.65
Donora,Pa. A7 ....7.65
Elyria,O. W8 ....7.65
FranklinPark,Ill. N5 ....7.65
Gary,Ind. R2 ....7.65
GreenBay,Wis. F7 ....7.65
Hammond,Ind. J5, L2 ..7.65
Hartford,Conn. R2 ....8.15
Harvey,Ill. B5 ....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ....7.65
Midland,Pa. C18 ....7.65
Monaca,Pa. S17 ....7.65
Newark,N.J. W18 ....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 ....7.65
Plymouth,Mich. P8 ....7.90
Putnam,Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
S.Chicago,Ill. W14 ....7.65
SpringCity,Pa. K3 ....8.10
Struthers,O. Y1 ....7.65
Warren,O. C17 ....7.65
Waukegan,Ill. A7 ....7.65
Willimantic,Conn. J5 ....8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon
(Turned and Ground)
Cumberland,Md.(5) C19..6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa. M12,R2 9.025
Bethlehem,Pa. B2 ....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 ....9.025
Camden,N.J. P13 ....9.20
Canton,O. T7 ....9.025
Carnegie,Pa. C12 ....9.025
Chicago W18 ....9.025
Cleveland A7, C20 ....9.025
Detroit B5, P17 ....9.225
Detroit S41 ....9.025
Donora,Pa. A7 ....9.025
Elyria,O. W8 ....9.025
FranklinPark,Ill. N5 ....9.025
Gary,Ind. R2 ....9.025
GreenBay,Wis. F7 ....9.025
Hammond,Ind. J5, L2..9.025
Hartford,Conn. R2 ....9.325
Harvey,Ill. R5 ....9.025
Lackawanna,N.Y. B3 ..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ...9.325
Massillon,O. R2, R8 ...9.025
Midland,Pa. C18 ....9.025
Monaca,Pa. S17 ....9.025
Newark,N.J. W18 ....9.20
Plymouth,Mich. P5 ....9.225
S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 ....9.20
Struthers,O. Y1 ....9.025
Warren,O. C17 ....9.025

Waukegan, Ill. A7 ....9.025
Willimantic, Conn. J5 ..9.325
Worcester, Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity, Ala. R2 ..5.675
Atlanta A11 .....5.25
Birmingham C15 .....5.25
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse, Mich. G5 .....5.675
Emeryville, Calif. J7 ...6.425
Fairfield, Ala. T2 .....5.675
Fairless, Pa. U5 .....5.825
Fontana, Calif. K1 ....6.375
Ft. Worth, Tex. (26) T4 5.25
Gary, Ind. U5 .....5.675
Houston S5 .....5.925
Ind. Harbor, Ind. I-2, Y1 .5.675
Johnstown, Pa. B2 ....5.675
Joliet, Ill. P22 .....5.675
KansasCity, Mo. S5 ....5.925
Kokomo, Ind. C16 .....5.775
Lackawanna, N.Y. B2 ..5.675
LosAngeles B3 .....6.375
Madison, Ill. L1 .....5.875
Milton, Pa. M18 .....5.825
Minnequa, Colo. C10 ....6.125
Niles, Calif. P1 .....6.375
Pittsburg, Calif. C11 ...6.375
Pittsburgh J5 .....5.675
Portland, Oreg. O4 ....6.425
SandSprings, Okla. S5 ..5.925
Seattle A24, B3, N14 ..6.425
S. Chicago, Ill. R2, W14 .5.675
S. Duquesne, Pa. U5 ....5.675
S. SanFrancisco B3 ....6.425
SparrowsPoint, Md. B2 ..5.675
Sterling, Ill. (1) N15 ....5.675
Sterling, Ill. N15 .....5.775
Struthers, O. Y1 .....5.675
Tonawanda, N.Y. B12 ...6.10
Torrance, Calif. C11 ...6.375
Youngstown R2, U5 ...5.675

BARS, Reinforcing, Billet (Fabricated: To Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johnstown, Pa. B2 .....7.33
KansasCity, Mo. S5.....7.60
Lackawanna, N.Y. B2 ..7.35
Marion, O. P11 .....6.70
Newark, N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings, Okla. S5 ..7.60
Seattle A24, B3, N14 ..7.95
SparrowsPt., Md. B2 ....7.33
St. Paul U8 .....8.17
Williamsport, Pa. S19 ...7.25

BARS, Wrought Iron

Economy, Pa. (S.R.) B14 15.10
Economy, Pa. (D.R.) B14 19.30
Econ. (DirectRolled) B14 13.55
Economy (Staybolt) B14 .19.80
McK. Rks. (S.R.) L5 ....14.50
McK. Rks. (D.R.) L5 ....19.80
McK. Rks. (Staybolt) L5. 20.95

BARS, Rail Steel

ChicagoHts. (3) C2, I-2 .5.575
ChicagoHts. (4) (44) I-2 .5.675
ChicagoHts. (4) C2 ....5.675
Franklin, Pa. (3) F5 ...5.575
Franklin, Pa. (4) F5 ...5.675
JerseyShore, Pa. (3) J8 ..5.55
Marion, O. (3) P11 ....5.575
Tonawanda (3) B12 ....5.575
Tonawanda (4) B12 .....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity, Ala. R2 ..5.10
Allenport, Pa. P7 .....5.10
Aliquippa, Pa. J5 .....5.10
Ashland, Ky. (8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken, Pa. A3 ..5.15
Detroit (8) M1 .....5.10
Ecorse, Mich. G5 .....5.10
Fairfield, Ala. T2 .....5.10
Fairless, Pa. U5 .....5.15
Farrell, Pa. S3 .....5.10
Fontana, Calif. K1 ....5.825
Gary, Ind. U5 .....5.10
Geneva, Utah C11 .....5.20
GraniteCity, Ill. (8) G4 ..5.20
Ind. Harbor, Ind. I-2, Y1 .5.10
Irvin, Pa. U5 .....5.10
Lackawanna, N.Y. B2 ..5.10
Mansfield, O. E6 .....5.10
Munhall, Pa. U5 .....5.10
Newport, Ky. A2 .....5.10
Niles, O. M21, S3 .....5.10
Pittsburg, Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth, O. P12 ....5.10
Riverdale, Ill. A1 .....5.10
Sharon, Pa. S3 .....5.10
S. Chicago, Ill. U5, W14 ..5.10
SparrowsPoint, Md. B2 ..5.10
Steubenville, O. W10 ....5.10
Warren, O. R2 .....5.10
Weirton, W. Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles, O. M21, S3 .....6.275

SHEETS, H.R., Alloy

Gary, Ind. U5 .....8.40
Ind. Harbor, Ind. Y1 ....8.40
Irvin, Pa. U5 .....8.40
Munhall, Pa. U5 .....8.40
Newport, Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa, Pa. J5 .....7.525
Ashland, Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken, Pa. A3 ..7.575
Ecorse, Mich. G5 .....7.525
Fairfield, Ala. T2 .....7.525
Fairless, Pa. U5 .....7.575
Farrell, Pa. S3 .....7.525
Fontana, Calif. K1 .....8.25
Gary, Ind. U5 .....7.525
Ind. Harbor, Ind. 1-2, Y1 7.525
Irvin, Pa. U5 .....7.525
Lackawanna (35) B2 ..7.525
Munhall, Pa. U5 .....7.525
Niles, O. S3 .....7.525
Pittsburgh J5 .....7.525
S. Chicago, Ill. U5, W14 .7.525
Sharon, Pa. S3 .....7.525
SparrowsPoint (36) B2 ..7.525
Warren, O. R2 .....7.525
Weirton, W. Va. W6 ....7.525
Youngstown U5, Y1 ....7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland, Ky. (8) A10 ....5.35
Cleveland R2 .....5.875
Warren, O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown, O. A10 ....6.775
Warren, O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity, Ala. R2 ..6.275
Aliquippa, Pa. J5 .....6.275
Allenport, Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken, Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse, Mich. G5 .....6.275
Fairfield, Ala. T2 .....6.275
Fairless, Pa. U5 .....6.325
Follansbee, W. Va. F4 6.275
Fontana, Calif. K1 .....7.40
Gary, Ind. U5 .....6.275
GraniteCity, Ill. G4 ....6.375
Ind. Harbor, Ind. I-2, Y1 6.275
Irvin, Pa. U5 .....6.275
Lackawanna, N.Y. B2 ..6.275
Mansfield, O. E6 .....6.275
Middletown, O. A10 ....6.275
Newport, Ky. A2 .....6.275
Pittsburg, Calif. C11 ..7.225
Pittsburgh J5 .....6.275
Portsmouth, O. P12 ....6.275
SparrowsPoint, Md. B2 ..6.275
Steubenville, O. W10 ...6.275
Warren, O. R2 .....6.275
Weirton, W. Va. W6 ....6.275
Yorkville, O. W10 .....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa, Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse, Mich. G5 .....9.275
Fairless, Pa. U5 .....9.325
Fontana, Calif. K1 ....10.40
Gary, Ind. U5 .....9.275
Ind. Harbor, Ind. I-2, Y1 9.275
Lackawanna (38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint (33) B2..9.275
Warren, O. R2 .....9.275
Weirton, W. Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala. City, Ala. R2	7.225	....
Ashland, Ky. A10	7.225	7.475
Canton, O. R2	7.225	....
Fairfield, Ala. T2	7.225	7.475
Gary, Ind. U5	7.225	7.475
GraniteCity, Ill. G4	7.325	....
Ind. Harbor I-2	7.225	7.475
Irvin, Pa. U5	7.225	7.475
Kokomo, Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts., Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind. Harbor, Ind. I-2 ....7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity, Ala. R2..6.875‡
Ashland, Ky. A10 ....6.875‡
Canton, O. R2 .....6.875‡
Dover, O. E6 .....6.875†
Fairfield, Ala. T2 ....6.875†
Gary, Ind. U5 .....6.875†
GraniteCity, Ill. G4 ....6.975*
Ind. Harbor, Ind. I-2 ..6.875†
Irvin, Pa. U5 .....6.875†
Kokomo, Ind. C16 ....6.975‡
MartinsFerry, O. W10..6.875*
Middletown, O. A10 ..6.875†
Pittsburg, Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt., Md. B2 ..6.875†
Warren, O. R2 .....6.875†
Weirton, W. Va. W6 ..6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin, Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt. (39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton, O. R2 .....7.275
Irvin, Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland, Ky. A10 .....7.125
Middletown, O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland (28) R2 .....7.65
Niles O. (28) R2 .....7.65
Weirton, W. Va. W6 ....7.50
Youngstown J5 .....7.50

SHEETS, Wall Casing

Fontana, Calif. K1 .....7.325

SHEETS, Aluminum Coated

Butler, Pa. A10 (type 1) 9.525
Butler, Pa. A10 (type 2) 9.625
Irvin, Pa. U5 (type 1) ..9.525

SHEETS, Enameling

Ashland Ky. A10 ....6.775
Cleveland R2 .....6.775
Fairfield, Ala. T2 .....6.775
Gary, Ind. U5 .....6.775
Ind. Harbor Ind. I-2, Y1 6.775
Irvin, Pa. U5 .....6.775
Middletown, O. A10 ....6.775
Niles, O. M21, S3 .....6.775
SparrowsPoint, Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover O. E6 .....8.70
Ind. Harbor, Ind. I-2 ....8.70
Mansfield, O. E6 .....8.70
Warren, O. R2 .....8.70
Yorkville, O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom, W. Va. W10 7.225
Gary, Ind. U5 .....7.225
Mansfield, O. E6 .....7.225
Middletown O. A10 ....7.225
Niles, O. M21, S3 .....7.225
Warren, O. R2 .....7.225
Weirton, W. Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown, O. A10 ....7.625

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N. Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&FuelAssoc.
E2 Eastern Stainless Steel
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div. Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Div., Bliss & Laughlin Inc.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 U. S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ...5.10
Allenport,Pa. P7 .....5.10
Alton,Ill. L1 .....5.30
Ashland,Ky.(8) A10 ....5.10
Atlanta A11 .....5.10
Bessemer,Ala. T2 .....5.10
Birmingham C15 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary Ind. U5 .....5.10
Ind.Harbor,Ind. I-2, Y1..5.10
Johnstown,Pa.(25) B2 ..5.10
Lackawanna,N.Y.(25) B2.5.10
LosAngeles(25) B3 ....5.85
LosAngeles C1 .....8.60
Minnequa,Colo. C10 ....6.20
Riverdale,Ill. A1 .....5.10
SanFrancisco S7 .....6.60
Seattle(25) B3 .....6.10
Seattle N14 .....6.60
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. W14 ....5.10
S.SanFrancisco(25) B3..5.85
SparrowsPoint,Md. B2 ..5.10
Torrance,Calif. C11 ....5.85
Warren,O. R2 .....5.10
Weirton,W.Va. W6 .....5.10
Youngstown U5 .....5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....8.40
Farrell,Pa. S3 .....8.40
Gary,Ind. U5 .....8.40
Houston S5 .....8.65
Ind.Harbor Ind. Y1 ....8.40
KansasCity,Mo. S5 ....8.65
LosAngeles B3 .....9.60
Lowellville,O. S3 .....8.40
Newport,Ky. A2 .....8.40
Sharon,Pa. A2, S3 ....8.40
S.Chicago,Ill. W14 ....8.40
Youngstown U5, Y1 ....8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10 .....7.575
Bessemer,Ala. T2 .....7.575
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.575
Fairfield,Ala. T2 .....7.575
Farrell,Pa. S3 .....7.575
Gary,Ind. U5 .....7.575
Ind.Harbor,Ind. I-2 Y1 7.575
Lackawanna,N.Y. B2 ...7.575
LosAngeles(25) B3 ....8.325
Seattle(25) B3 .....8.575
Sharon,Pa. S3 .....7.575
S.Chicago,Ill. W14 ....7.575
S.SanFrancisco(25) B3 .8.325
SparrowsPoint,Md. B2 .7.575
Warren,O. R2 .....7.575
Weirton,W.Va. W6 ....7.575
Youngstown U5, Y1 ..7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ....5.35
Warren,O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S40 .....7.425
Cleveland A7, J5 .....7.425
Dearborn,Mich. S3 ....7.425
Detroit D2, M1, P20 ..7.425
Dover,O. G6 .....7.425
Evanston,Ill. M22 ....7.525
Farrell,Pa. S3 .....7.425
Follansbee,W.Va. W10 .7.425
Fontana,Calif. K1 .....9.20
FranklinPark,Ill. T6 ..7.525
Ind.Harbor,Ind. Y1 ....7.425
Indianapolis S41 .....7.575
LosAngeles C1, S41 ....9.30
McKeesport Pa. E10 ..7.525
NewBedford,Mass. R10..7.875
NewBritain Conn. S15..7.875
NewCastle,Pa. B4, M22..7.425
NewHaven,Conn. D2 ..7.875
NewKensington,Pa. A6..7.425
Pawtucket,R.I. R3, N8..7.975
Philadelphia P24 .....7.875
Pittsburgh J5 .....7.425
Riverdale,Ill. A1 .....7.525
Rome,N.Y.(32) R6 ....7.425
Sharon,Pa. S3 .....7.425
Trenton,N.J (31) R5 ..8.875
Warren,O. R2, T5 ....7.425
Worcester,Mass. A7 ...7.975

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Carnegie Pa. S18 .....15.55
Cleveland A7 .....15.55
Dover,O. G6 .....15.55
Farrell,Pa. S3 .....15.55
FranklinPark,Ill. T6 ..15.55
Harrison,N.J. S18 ....15.55
Indianapolis S41 .....15.70
LosAngeles S41 .....17.75
Lowellville,O. S3 .....15.55
Pawtucket,R.I. N8 ....15.90
Riverdale Ill. A1 .....15.55
Sharon,Pa. S3 .....15.55
Worcester,Mass. A7 ....15.85
Youngstown S41 .....15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn,Mich. S3 ....10.80
Dover,O. G6 .....10.80
Farrell,Pa. S3 .....10.80
Ind Harbor,Ind. Y1 ....10.80
Sharon,Pa. S3 .....10.80
Warren,O. R2 .....10.80
Weirton W.Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, M22	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	9.85	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn W1	18.85	22.95	27.80
Buffalo W12	18.85	....	....
Fostoria,O. S1	19.05	22.15	....
FranklinPark,Ill. T6	19.20	23.30	28.15
Harrison,N.J. C18	18.85	22.95	27.80
NewYork W3	18.85	22.95	27.80
Palmer,Mass. W12	18.85	....	....
Trenton,N.J. R5	18.85	22.95	27.80
Worcester,Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....8.175

STRIP, C.R., Electrogalvanized

Cleveland A7 .....7.425*
Dover,O. G6 .....7.425*
Evanston,Ill. M22 ....7.525*
McKeesport,Pa. E10 ..7.50*
NewCastle,Pa. M22 ..7.425*
Riverdale,Ill. A1 ....7.525*
Warren O. B9, S3, T5..7.423*
Worcester,Mass. A7 ...7.975
Youngstown S41, Y1 .7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell,Pa. S3 .....7.50
Sharon,Pa. S3 .....7.50

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.825
Farrell,Pa. S3 .....5.525
Riverdale,Ill. A1 .....5.675
Sharon,Pa. S3 .....5.525
Youngstown U5 .....5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless Pa. U5	9 20	9.45	9.85
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.60
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O R2	9.10	9.35	9.75
Pittsburg Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)

Aliquippa,Pa. J5 (21-27 Ga.)	7.90	8.10	....
IndianaHarbor,Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles,O R2 (20-27 Ga.)	7.90	8.10	8.30

TIN PLATE,Hot Dipped 1.25 Common Coke	lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.50	10.75
Fontana,Calif.K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Ind Harb. Y1	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va.W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$8.20
Fairfield,Ala. T2	8.30
Fairless,Pa. U5	8.30
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.20
GraniteCity G4	8.30
Ind.Harbor,Ind. I-2, Y1	8.20
Irvin,Pa. U5	8.20
Niles,O. R2	8.20
Pittsburg,Calif. C11	8.85
SparrowsPoint,Md. B2	8.20
Weirton,W.Va. W6	8.20
Yorkville,O. W10	8.20

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5	7.85
Gary Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. Y1	7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5	$10.05
Irvin,Pa. U5	10.05

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65
Vandergrift,Pa. U5					8.10
Mansfield,O. E6					8.10
Warren,O. R2 (Silicon Lowcore)					8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ..8.00
Aliquippa,Pa. J5 .....8.00
Alton,Ill. L1 .....8.20
Atlanta A1 .....8.00
Bartonville,Ill. K4 ....8.10
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 ....8.00
Crawfordsville,Ind. M8..8.10
Donora,Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield,Ala. T2 .....8.00
Fostoria,O. (24) S1 ...8.10
Houston S5 .....8.25
Jacksonville,Fla. M8 ...8.35
Johnstown,Pa. B2 .....8.00
Joliet,Ill. A7 .....8.00
KansasCity,Mo. S5 .....8.25
Kokomo,Ind. C16 .....8.10
LosAngeles B3 .....8.95
Minnequa,Colo. C10 ...8.25
Monessen,Pa. P7, P16..8.00
Palmer,Mass. W12 .....8.30
Pittsburg,Calif. C11 ...8.95
Portsmouth,O. P12 ....8.00
Rankin,Pa. A7 .....8.00
S.Chicago,Ill. R2 .....8.00
S.SanFrancisco C10 ....8.95
SparrowsPoint,Md. B2 ..8.10
Sterling Ill. (1) N15 ....8.00
Sterling,Ill. N15 .....8.10
Struthers,O. Y1 .....8.00
Waukegan,Ill. A7 .....8.00
Worcester,Mass. A7 ....8.30

WIRE, Cold Heading Carbon

Elyria,O. W8 .....8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4 ....12.65
Buffalo W12 .....13.40
Cleveland A7 .....12.65
Donora,Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown,Pa. B2 .....13.40
KansasCity,Mo. U3 ....12.90
Minnequa,Colo. C10 ...12.775
Monessen,Pa. P7, P16..12.65
Muncie,Ind. I-7 .....13.60
NewHaven,Conn. A7 ....12.95
Palmer Mass. W12 .....13.70
Pittsburg,Calif. C11 ...13.45
Portsmouth,O. P12 ....12.65
Roebling,N.J. R5 .....12.95
SparrowsPt.,Md. B2 ...13.50
Struthers,O. Y1 .....13.40
Trenton,N.J. A7 .....12.95
Waukegan,Ill. A7 .....12.65
Worcester,Mass. A7 ....12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Bartonville,Ill. K4 ....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
Kokomo Ind. C16 .....9.85
LosAngeles B3 .....10.70
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
NewHaven,Conn. A7 ...10.05
Palmer,Mass. W12 ....10.05
Pittsburg,Calif. C11 ...10.70
Portsmouth,O. P12 ....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ....10.70
SparrowsPt.,Md. B2 ....9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Worcester,Mass. A7, J4,T6 10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Bartonville,Ill. K4 ....9.85
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Fostoria,O. S1 .....9.80
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
LosAngeles B3 .....10.70
Millbury,Mass.(12) N6..10.05
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16..9.75
Muncie,Ind. I-7 .....9.95
Palmer,Mass. W12 .....10.05
Pittsburg,Calif. C11 ...10.70
Portsmouth O. P12 ....9.75
Roebling,N J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ....10.70
SparrowsPt.,Md. B2 ....9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Wor'ster,Mass.A7,J4,T6 10.05

WIRE, Fine & Weaving (8" Coils)

Alton,Ill. L1 .....16.50
Bartonville,Ill. K4 ....16.40
Chicago W13 .....16.30
Cleveland A7 .....16.30
Crawfordsville,Ind. M8..16.40
Fostoria,O. S1 .....16.30
Houston S5 .....16.55
Jacksonville,Fla. M8 ..16.65
Johnstown Pa. B2 .....16.30
KansasCity,Mo. S5 .....16.55
Kokomo,Ind. C16 .....16.30
Minnequa,Colo. C16 ....16.55
Monessen,Pa. P16 .....16.30
Muncie,Ind. I-7 .....16.50
Palmer Mass. W12 .....16.60
S.SanFrancisco C10 ....17.15
Waukegan,Ill. A7 .....16.30
Worcester,Mass. A7, J6.16.60

ROPE WIRE (A)

Bartonville,Ill. K4 .....13.45
Buffalo W12 .....13.45
Fostoria,O. S1 .....13.45
KansasCity,Mo. U3 .....13.70
Johnstown,Pa. B2 .....13.45
Monessen,Pa. P7 .....13.45
Muncie Ind. I-7 .....13.65
Palmer,Mass. W12 .....13.75
Portsmouth,O. P12 .....13.45
Roebling,N.J. R5 .....13.75
St.Louis L8 .....13.45
SparrowsPt.,Md. B2 ...13.56
Struthers,O. Y1 .....13.45
Worcester,Mass. J4 .....13.75
(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock Sizes — Col.

AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, Cut (100 lb kegs)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES — Col.

AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	177
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.)(per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$8.78
Atlanta A11	10.36
Bartonville,Ill. K4	8.88
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	8.88
Donora,Pa. A7	8.78
Duluth A7	8.78
Fairfield,Ala. T2	8.78
Houston S5	10.51
Jacksonville,Fla. M8	8.88
Johnstown,Pa. B2	8.78
Joliet,Ill. A7	8.78
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	8.88
LosAngeles B3	9.44
Minnequa,Colo. C10	9.49
Pittsburg,Calif. C11	9.44
S.Chicago,Ill. R2	8.78
S.SanFrancisco C10	9.94
SparrowsPt.,Md. B2	8.88
Sterling,Ill.(37) N15	8.88

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.06
Atlanta A11	10.70
Bartonville,Ill. K4	9.16
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.16
Donora,Pa. A7	9.06
Duluth A7	9.06
Fairfield,Ala. T2	9.06
Houston S5	10.85
Jacksonville,Fla. M8	9.16
Johnstown,Pa. B2	9.06
Joliet,Ill. A7	9.06
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.16
LosAngeles B3	9.75
Minnequa,Colo. C10	9.79
Pittsburg,Calif. C11	9.75
S.Chicago,Ill. R2	9.06
S.SanFrancisco C10	10.26
SparrowsPt.,Md. B2	9.16
Sterling,Ill.(37) N15	9.16

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.11
Atlanta A11	10.75
Bartonville,Ill. K4	9.21
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.21
Donora,Pa. A7	9.11
Duluth A7	9.11
Fairfield,Ala. T2	9.11
Houston S5	10.90
Jacksonville,Fla. M8	9.21
Johnstown,Pa. B2	9.11
Joliet,Ill. A7	9.11
KansasCity,Mo. S5	10.96
Kokomo,Ind. C16	9.21
LosAngeles B3	9.80
Minnequa,Colo. C10	9.84
Pittsburg,Calif. C11	9.80
S.Chicago,Ill. R2	9.11
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.21
Sterling,Ill.(37) N15	9.21

BALE TIES, Single Loop — Col.

AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS — Col.

Birmingham C15	177
ChicagoHts.,Ill. C2, 1-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed — Col.

AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	198§
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213*
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198

WOVEN FENCE, 9-15 Ga. — Col.

Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	192§
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE (16 gage)	**An'ld Stone**	**Galv. Stone**
Ala.City,Ala.R2	17.85	19.40**
Aliq'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Cleveland A7	17.85	....
Craw'dville M8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	18.95	19.80‡‡
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.95	19.50†
Minnequa C10	18.10	19.65**
P'lm'r,Mass.W12	18.15	19.70†
Pitt.,Calif. C11	18.20	19.75†
St'ling(37) N15	17.95	19.80
SparrowsPt. B2	17.95	19.75§
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

WIRE, Merchant Quality

(6 to 8 gage)	**An'ld Galv.**
Ala.City,Ala. R2	9.00 9.55**
Aliquippa J5	8.65 9.325§
Atlanta(48) A11	9.10 9.775§
Bartonville(48) K4	9.85 19.90
Buffalo W12	9.00 9.55†
Cleveland A7	9.00 ....
Crawfordsville M8	9.10 9.80††
Donora,Pa. A7	9.00 9.55†
Duluth A7	9.00 9.55†
Fairfield T2	9.00 9.55†
Houston(48) S5	9.25 9.80**
Jack'ville,Fla. M8	9.10 9.80††
Johnstown(48) B2	9.00 9 675§
Joliet,Ill. A7	9.00 9.55†
KansasCity(48)S5	9.25 9.80**
Kokomo(48) S16	9.10 9.65†
LosAngeles B3	9.95 10.625§
Minnequa C10	9.25 9.80**
Monessen(48) P7	8.65 9.35§
Palmer,Mass. W12	9.30 9.85†
Pitts.,Calif. C11	9.95 10.50†
Rankin,Pa. A7	9.00 9.55†
S.Chicago R2	9.00 9.55**
S.SanFran. C10	9.95 10.50**
Spar'wsPt.(48)B2	9.10 9.775§
St'ling(37)(48)N15	9.10 9.80
Struthers,O. Y1	9.00 9.65‡
Worcester,Mass.A7	9.30 9.85†

Based on zinc prices of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras.

FASTENERS

(Consumer discounts per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent; heavy hex nut 1⅛ in. through 1½ in. tapped 8 threads, add 10 per cent)

HEX HEAD CAP SCREWS, coarse or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated, ¼ in. thru 1 in. diam., listed lengths:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

BOLTS, Standard stock sizes:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
*Bulk	50

*Hot galvanized or zinc plated lag bolts only — for package or bulk quantities use applicable list less bulk discounts.

HEXAGON NUTS, American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packages	43.75
Bulk	50

CAP AND SETSCREWS,

Fillister Head, Cap Screws, Coarse Thread:

Packages	+55
Bulk	+16

Flat Head Cap Screws:

¾ in. and smaller, 6 in. and shorter:

Packages	+85
Bulk	+38

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam. 6 in. and shorter:

Packages	+ 5
Bulk	+19

Through 1 in. diam., longer than 6 in.:

Packages	+29

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.85

⅞ in. and smaller by 6 in. and shorter: 15% off list.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Buffalo W12	*$26.20*	*$38.50*	*$47.90*	*$61.30*	*$80.30*
Cleveland A7	28.95	43.40	55.40	73.00	....
KansasCity,Mo. U3	*26.20*	*38.50*	*47.90*	*61.30*	*80.30*
Monessen,Pa. P16	32.15	48.20	61.55	81.10	105.65
NewHaven,Conn. A7	28.95	43.40	55.40	73.00	95.10
Pittsburg,Calif. C11	28.95	43.40	55.40	73.00	95.10
Minnequa,Colo. C10	*26.20*	*38.50*	*47.90*	*61.30*	*80.30*
Roebling,N.J. R5	*26.20*	*38.50*	*47.90*	*61.30*	*80.30*
SparrowsPoint,Md. B2	*26.20*	*38.50*	*47.90*	*61.30*	*80.30*
St.Louis L8	*26.20*	*38.50*	*47.90*	*61.30*	*80.30*
Waukegan,Ill. A7	28.95	43.40	55.40	73.00	95.10

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	53.17	40.26
2½	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Rails				
Bessemer,Pa. U5	5.75	5.60	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	6.875

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

SCREW SPIKES

Lebanon,Pa. B2	15.10

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in.; 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(12) Worcester, Mass., base.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 5.40c.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds, 9.65c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 13.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	H.R. Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	31.25	42.00	43.75	47.00	49.50	45.75	55.00	55.00
304L	....	....	49.75	51.50	54.75	57.25	53.50	62.75	62.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.25	75.75	71.75	80.75	80.75
316L	....	....	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.00	65.50
330	....	....	123.25	....	113.00	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co., Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

Stainless	Plates—Carbon Base 5%	10%	15%	20%	Sheets Carbon Base 20%
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	56.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	36.80	44.20

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	V-Cr Hot Work (H-13)	0.550
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-12)	0.530
Oil Hardening (O-1)	0.505	W Hot Wk. (H-21)	1.425-1.44
V-Cr Hot Work (H-11)	0.505	Hi-Carbon-Cr (D-11)	0.955

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L6, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N. Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago R2	66.00	66.50	66.50	67 00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon, Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69 00	69.50
New York, deld.	....	75.50	76.00	....
Newark, N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy, N.Y. R2	68.00	68.50	69.00	69 50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKees Rocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding, Monaca, Pa., deld.	....	68.26	68.26	69.79
Verona, Trafford, Pa., deld	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld.	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield, Ohio, deld.	71.30	....	71.80	72.30
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
Granite City, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68 00	68 50	69.00	....
Rockwood, Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo, Ohio I-3	66 00	66 50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry. K2	89.00
Keokuk, Iowa O.H. & Fdry, 12½ lb pigiets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max).	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	73.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb items (except stainless) ordered by themselves. Prices will vary with total weight of the order or weight of the individual items or both. Base quantities for stainless sheets: 8000 lb. except in Chicago, New York, Boston, Seattle, 10,000 lb and in San Francisco, 2000 to 4999 lb. City delivery charges are 15 cents per 100 lb except: Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no charge.

	SHEETS				STRIP	BARS			STRUCTURAL	PLATES	
	Hot Rolled	Cold Rolled	Galv.	Stainless Type 302	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.83	....	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	8.27	8.66	10.06	....	8.28	8.95	11.80	16.38	9.53	8.84	10.43
Birmingham	9.43	10.20	10.46	....	10.41	8.26	13.14	16.76	8.47	8.41	10.90
Boston	9.67	10 58	11.77	53.50	12.16	9.77	13.35	16.59	10.16	9.62	11.08
Buffalo	8.80	9.95	11.15	55.98	10.65	9.00	11.45	16.30	9.65	9.00	10.85
Charlotte, N. C.	10.81	11.22	11.34	....	12.29	10.97	12.68	....	11.38	11.17	12.18
Chicago	8.74	10.20	10.95	53.00	10.40	8.84	10.65	15.95	9.33	8.67	10.46
Cincinnati	8.91	10.26	11.00	53.43	10.72	9.16	11.53	16.27	9.89	9.05	10.79
Cleveland	8.73	9.88	11.14	52.33	10.51	8.96	11.25	16.06	9.75	8.92	10.56
Dallas	9.62	10.43	12.59	....	11.18	9.03	12.98	16.95	9.26	9.35	11.02
Detroit	9.00	10.46	11.30	56.50	10.77	9.15	11.01	16.23	9.89	9.04	10.72
Denver	9.41	11.77	12.11	....	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	9.22	10.03	12.19	52.00	10.78	8.63	13.10	16.55	8.86	8.95	10.62
Indianapolis	9.18	10.64	11.39	....	10.84	9.28	11.09	16.39	9.77	9.11	10.90
Kansas City	9.21	10.87	11.35	....	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	9.59	11.29	12.20	57.60	11.29	9.67	14.20	17.35	10.54	9.82	11.79
Milwaukee	8.88	10.34	11.09	....	10.54	8.98	10.89	16.09	9.55	8.81	10.60
New York	9.36	10.13	11.35	53.08	11.46	9.74	13.25	16.40	10.20	9.51	11.05
Philadelphia	8.85	10.00	10.89	52.17	10.85	9.25	11.95	16.48	9.45	9.25	10.45
Pittsburgh	8.73	9.88	11.03	52.33	10.49	8.85	11.25	15.95	9.36	8.68	10.32
St. Louis	8.84	10.58	11.33	....	10.50	8.95	11.28	16.33	9.45	8.78	10.57
St. Paul	9.00	9.59	10.74	....	10.66	9.12	11.49	16.54	9.63	8.95	10.49
San Francisco	10.17	11.69	11.45	55.10	11.78	10.07	15.10	17.25	10 49	10.38	12.47
Seattle	10.07	11.44	12.05	56.52	11.84	9.96	16.20	17.80	10.59	10.17	12.46
Spokane, Wash	9.92	11.29	11.90	56.52	11.69	9.81	16.20	17.80	10.44	10.02	12.31

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Dallas and Houston, 10 Ga. x 48 x 120 in.; hot rolled strip, ⅛ in. x 1 in.; hot rolled carbon bars, ¾ in.—2⅛ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅞ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plates, ¼ in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Nario, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.00.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅝ in. grains with fines: Baltimore, $73.

*—9 in. x 4½ x 2.50 straights.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CAF, content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $28-$28.50; barge, Brownsville, Tex., $30-$31.

Canadian Steel

(Cents per pound, f.o.b. mill, except as otherwise noted)

Billets, Blooms & Slabs:	
Carbon, Forging Quality (net ton)	$97.00
Alloy (net ton)	115.00
Wire Rods:	
Carbon ⅓" to under ¼ in.	5.30
Carbon, ¼ in. to 47/64 in.	5.70
Alloy	6.40
Wire (carload lots)	8.40
Bars & Small Shapes:	
Carbon, merchant quality	5.40
Carbon, special quality	5.85
Alloy	6.40
Bar Mill Bands:	
Carbon	5.40
Alloy	8.05
Structural Size Angles & Zees	5.40
Plates:	
Carbon	5.45
Sheets & Coils, Hot Rolled:	
Carbon Sheets	5.00
Carbon Strip	5.00
Sheets & Coils, Cold Rolled:	
Carbon Sheets	6.35
Carbon Strip (0.080 and lighter)	6.35
Carbon Strip (0.081 and heavier)	6.65
Sheets & Coils, Galvanized:	
Standard Quality	6.70
Culvert Quality	7.00
Sheets, Porcelain Enameling	7.45
Sheets & Coils, Electrical:	
Field Grade	9.00
Armature Grade	9.50
Electrical Grade	10.15
Tin Mill (Per Base Box; **Products** 100 lb basis wt)	
Coke Tin Plate (1.25 lb pot yield)	$10.60
Electrolytic Tin Plate (0.25 lb coating)	9.10
Black Plate	8.30
Nails, c.l. lots, (per keg) 400 keg min.	$8.15

Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. truckiots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85‡
40 mesh, bags	8.10††
Electrolytic Iron, Melting stock, 99.87% Fe, irreg. fragments, ⅛ in. x 1.3 in. (In contract lots of 750 tons price is 22.75c)	28.75
Annealed, 99.5% Fe, 36.75, ton, del. east of Mississippi.	
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh)	58.0
Carbonyl Iron: 90-99.9%, 3 to 20 microns, depending on grade, 88.00-700.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 500-lb drum freight allowed, c.l. 39.80; ton lots 41.80	
Brass, 80/20, leaded (60 mesh)	40.90
Bronze, filter powder, 90/10	47.00*
Copper, all types	15.25*
Lead	7.50*
Manganese, minus 35 mesh	$1.00
Nickel	$0.95-$1.15
Nickel-Silver,	61.70
Solder	15.00*
Stainless Steel, 304	89.00
Stainless Steel, 316	$1.07
Steel, AISI 4650	32.00
Tin	14.00*
Zinc,	25.90
Tungsten: Carbon reduced, 98.8% min., minus 65 mesh	Dollars nom.**
Molybdenum	4.35

*Plus cost of metal. ‡Depending on mesh. §Cutting and scarfing grades. **Depending on price of ore. ††Welding grade.

Ores

Lake Superior Iron Ore

(Prices effective for the 1960 shipping season, subject to later revision, gross ton. 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.55
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1960, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, Concentrates	nom.

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	21.00†
Brazilian iron ore, 68.5%	21.00

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$19.00-19.50
Domestic, concentrates, f.o.b. milling points	22.00-23.00

*Before duty. †Nominal.

Manganese Ore

Mn 46-48%, Indian, 88-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian	
48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†
South African Transvaal	
44% no ratio	18.00†
48% no ratio	24.00-26.00†
Turkish	
48% 3:1	36.00-37.00†
Domestic	
Rail nearest seller	
48% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard	
55-60%	$2.50-2.75
60-65%	2.80-3.20

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

†Nominal.

Metallurgical Coke

Price per net ton

Beehive Ovens	
Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50
Oven Foundry	
Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Chattanooga, Tenn., ovens	30.80
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens: New England, deld.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.19
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.68
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes*	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.75	$5.65	$5.65	$5.50	$5.85
Bar Size Angles	5.85	5.75	5.75	5.60	5.95
Structural Angles	5.65	5.55	5.55	5.40	5.75
I-Beams	5.60	5.50	5.50	5.35	5.70
Channels	5.60	5.50	5.50	5.35	5.70
Plates (basic bessemer)	6.00	5.90	5.90	5.75	6.10
Sheets, H.R.	7.50	7.55	7.40	7.30	7.65
Sheets, Galvanized, 20 Ga., 36 in. x 96 in.	9.70	9.75	9.60	9.50	9.85
Sheets, Galv. (in coils) 20 Ga., 48 in. wide	9.60	9.65	9.50	9.40	9.75
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	25.08	24.20	24.42	24.15	25.47
Barbed Wire (†)	6.25	6.15	6.15	6.00	6.35
Merchant Bars	5.85	5.75	5.75	5.60	5.95
Hot-Rolled Bands	6.20	6.10	6.10	5.95	6.30
Wire Rods, Thomas Commercial No. 5	6.40	6.40	6.30	6.25	6.60
Wire Rods, O. H., No. 5	6.75	6.75	6.65	6.60	6.95
Bright Common Wire Nails (§)	8.50	7.40	7.40	7.25	7.65

†Per 82 lb net reel. §Per 100-lb keg, 20d nails and heavier.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.

Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg (deld. east of Rockies)	25.00

Cents per lb, f.o.b. tank cars or tank trucks, deld.

Phenol, 90 per cent grade	14.75

Per net ton bulk, f.o.b. cars or trucks, plant.

Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs, per gross ton. Palmerton, Pa. 21-23% Mn, $102.50, 19-21% Mn, 1-3% Si, $100; 16-19% Mn, $98. For Neville Island, Pa., prices add $2.50 as of Feb. 1. Lump 35 lb and down: Deduct $2 from 10 lb pig prices at Palmerton.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va., Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston Tex.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained maganese over 76% or under 74%, respectively (Mn 79-81%). Lump $228 per net ton, f.o.b. Anaconda, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractinos in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3c for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload, 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of alloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.3c from above prices. For 3% grade Si 12.5-16% deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome: No. 1 (Cr 61-65%, C 5-7%, Si 5-8%), 22.00c.

Blocking Chrome: No. 1 (Cr 61-65%, C 5-7%, Si 5-8%), 22.00c; No. 2 (Cr 58-63%, C 5-6%, Si 8-10%), 23.00c; No. 3 (Cr 58-63%, C 5-6%, Si 10-12%), 23.00c.

Refined Charge Chrome: No. 1 (Cr 50-55%, C 5% max, Si 2% max), 25.00c; No. 2 (Cr 56-60% C 5% max, Si 2% max), 25.00c.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 31.50c per lb contained Cr; 0.010% max, 32.50c. Delivered.
Cr 67-71%, carload, lump, bulk, 0.025% max, 34.50c; 0.05% max, 33.50c; 0.10% max, 33.25c; 0.20% max, 33.00c; 0.50% max, 32.75c; 1.0% max, 32.50c; 1.5% max, 32.25c; 2.0% max, 32.00c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). 8M x D, carload, bulk, 20.05c per lb of alloy carload packed, 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, St 42-45%, C 0.05% max, 26.25c per lb contained Cr and 14.60c per lb contained Si; Cr 33-36%, Si 45-48%, C 0.05% max, 28.25c per lb contained Cr, 14.60c per lb contained Si; 0.75 in. x down, 29.40c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis Fe 0.2% max). Contract, carlot, packed, 2" x D plate (above ¼" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20 max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Chattanooga, Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lot, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk, 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload, $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3¾ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb of briquet; c.l., packed, bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 14c per lb of briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3c. Delivered. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.15 per lb (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 4% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 44-47% approx, Ta 15% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots, $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carload, bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk, 19.25c. Packed c.l. 20.25c, 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (65-75%). Per lb of contained Mo in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.

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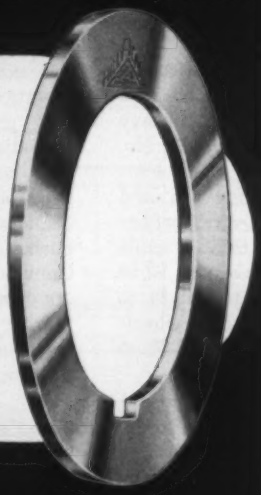

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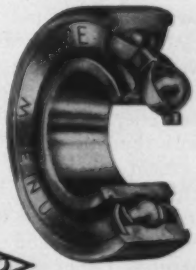

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Scrap Price Decline Is Continuing

STEEL's composite on No. 1 heavy melting grade slips another 67 cents to $31.33. Absence of substantial domestic demand and sluggish steel operations reflected

Scrap Prices, Page 218

• **Pittsburgh** — Prices of dealer grades are unchanged. Some dealers say they would not sell No. 1 heavy melting for less than $35 a ton, but concede "distress" tonnage is moving at lower prices. An out-of-town buyer offered a local dealer $32.50 for No. 1 heavy melting, delivered Youngstown. When allowance is made for the $4.45 freight, the seller would have realized no more than he might have made on a recent sale at $31 delivered to a mill on the fringe of this district. B&O Railroad sold its No. 1 heavy melting at $34.55 (vs. $36 last month). Other grades dropped as much as $3 a ton.

• **Chicago** — Leading grades of steelmaking scrap are off $1 a ton, and some specialties are down as much as $3 and $4 in a market in which confirmed mill buying is negligible. Although the bottom of the market is believed near, further declines are thought likely. With the district steel rate dropping another 3.5 points, marking the eleventh straight week of decline, prospects for early renewal of scrap buying by the mills is not promising. Some cast iron grades are weaker by $1 a ton. Reasons: Foundry order backlogs are dwindling and vacation shutdowns are less than a month away.

• **Philadelphia**—Domestic prices on the open hearth grades are off $1 a ton in light trading. No. 1 heavy melting is now $34, delivered; No. 2 heavy melting is $30; No. 1 bundles and No. 1 busheling $36, and No. 2 bundles $20. Electric furnace bundles are down $1 to $37, while machine shop turnings are off $2 to $15. Heavy turnings are off $1 to $28; couplers, springs, and wheels $3 to $41; and rail crops, $2-$3 to $56-$57.

Heavy breakable cast is down $1 to $41, and malleable $2-$3 a ton to $51. Low phos structurals and plates, No. 1 cupola cast, and drop broken machinery are unchanged. Mixed borings and turnings are unchanged but nominal.

Export demand continues active, and third quarter prospects are considered promising.

• **New York**—Because of good export trading, brokers' buying prices are steady despite slack demand on domestic account. Heavy breakable cast is quoted slightly higher at $32-$33, but 18-8 borings and turnings are off $5 to $80-$85. All other items are unchanged.

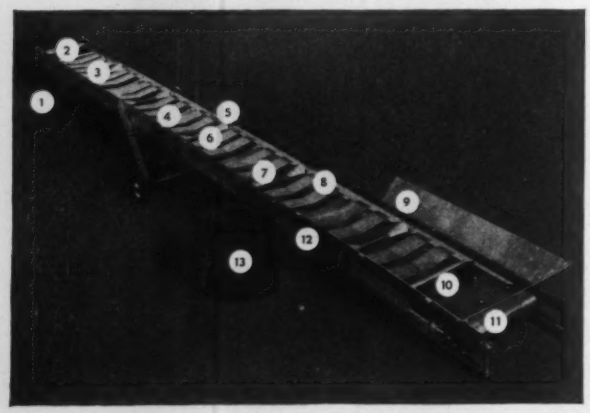
• **Cleveland** — Sharp recovery in steelmaking operations in Youngstown (the ingot rate there rose 13 points to 40 per cent of capacity last week) stimulated a little scrap buying at that point. One steelmaker reportedly bought some No. 1 heavy melting industrial material, but the report is unconfirmed. Dealer grades continue to move sluggishly, with No. 1 heavy melting nominally quoted around $31.

• **Detroit**—Orders are lacking in this market, and there's little expectation by dealers of much business through the month. Even Canadian mills aren't buying much here, partly because of the increasing tonnage being generated in Canada. Four or five carloads of busheling were reported sold in Canada at $24. Brokers and dealers expect prices to hold until some market action, such as increased third quarter orders, starts scrap flowing in good volume again.

• **Buffalo**—Prevailing scrap prices have been reaffirmed for June delivery on small orders. Consumers paid $31 for No. 1 heavy melting, $26 for No. 2 heavy melting, and $23 for No. 2 bundles. No orders for turnings have been placed for June shipment, but prices on that grade are nominally unchanged.

• **St. Louis**—The market continues inactive. The mills don't need additional material, drawing on their inventories. Occasionally, an order for a carload is placed with a broker, but otherwise there is little in the way of new business. Quoted prices are largely nominal, in the main prevailing only on token sales.

• **Cincinnati**—The market is at a virtual standstill. Buying to fill even small tonnage orders is proving dif-



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these lightweight FARNCO conveyors...
take steel mill abuse better because of these features...

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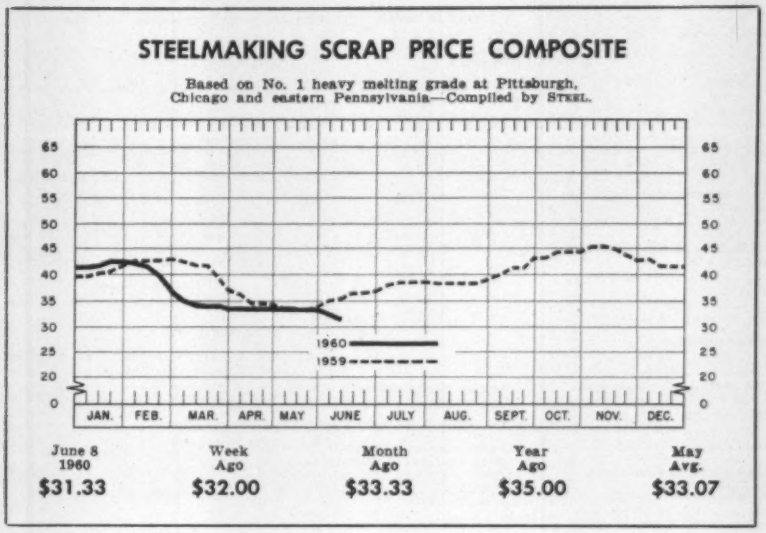
2. Crowned head pulley
3. Clean out opening and scraper
4. Cone carrier
5. Anti-friction bearings thruout
6. Angle braces
7. Shock plates
8. Wear strip
9. Alloy hopper 4'-0" long
10. Clean out opening and scraper
11. Head and crowned tail pulley
12. Extruded aluminum alloy frame
13. Belt rubber covered



ficult as dealer price resistance mounts.

• **Birmingham**—Local prices have slipped further on some foundry and electric furnace grades of scrap. But even at the lower levels, the tonnage movement is limited. Brokers still list quotations as nominal, and expect the market to go lower. Open hearth steel buyers are out of the market, but a large Birmingham electric furnace interest resumed limited buying last week.

• **Toronto, Ont.** — Prices on iron and steel scrap have been sharply reduced here. Dealers have lowered their quotations on some items more than $6 a ton.

• **Seattle**—Prices are steady here, but market activity is limited. There is some export buying being done, giving the situation a slightly firmer tone. Larger buyers are restricting their orders. Supplies are ample, and yard operations are below normal.

• **San Francisco**—Scrap for export is bringing several dollars a ton over the posted mill prices, and there is some clamoring by dealers that the export quotations be accepted as representative for the overall market, especially since mill offers are nominal.

• **Los Angeles**—With substantial tonnage moving on export account, the market here appears to be a little firmer.

Consumers' Scrap Stocks Decline During March

Domestic consumption of ferrous scrap and pig iron totaled 13,536,000 gross tons in March, reports the U. S. Bureau of Mines. Of the total, 6,661,000 tons were scrap and 6,875,000 tons were pig iron. Exclusive of iron ore and agglomerates, the metallics' charge in March consisted of 49.2 per cent scrap and 50.8 per cent pig iron compared with 49.6 per cent scrap and 50.4 per cent iron in the preceding month.

Scrap stocks held by domestic consumers on Mar. 31 totaled 8,291,000 gross tons, down 3 per cent from the preceding month. Stocks of pig iron amounted to 2,751,000 tons, up 4 per cent from the month before.

Pig Iron . . .

Pig Iron Prices, Page 212

Demand for merchant iron continues to decline. Because of vacations, July movement will be the lightest this year.

Merchant iron producers are able to take care of all demand despite a substantial reduction in blast furnace operations. Bethlehem Steel Co. has banked another furnace at Lackawanna, N. Y., leaving only four out of seven in production.

Slightly lower freight rates from Troy, N. Y., to New England consuming points are more frequent, narrowing equalization on iron shipped from storage at Beacon, N. Y. The rate to Boston is $7.20 per gross ton on 50-ton lots. Lower rates are also announced to Concord, Manchester, Dover, Franklin, and Nashua, N. H.

Most of the No. 2 foundry and malleable iron stocked at the closed Mystic furnace at Everett, Mass., has been shipped. The market for basic iron has narrowed to one major Rhode Island consumer.

Iron Ore . . .

Iron Ore Prices, Page 213

Stocks of iron ore at furnaces and docks (U. S. and Canada) at the end of April totaled 38,504,036 gross tons, up 807,597 tons from the 37,696,439 held at the end of April a year ago, reports the American Iron Ore Association. Stocks in the U. S. amounted to 37,343,966 tons vs. 36,365,046 at the end of April, 1959.

Consumption of ore in April (U. S. and Canada) totaled 11,029,520 tons vs. 12,111,179 in April. 1959. Consumption in the first four months of the year was 47,755,311 tons vs. 44,686,680 in the same period last year.

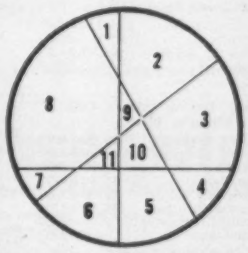
Of 273 blast furnaces (258 in the U. S. and 15 in Canada) only 216 were operating (203 in the U. S. and 13 in Canada) at the end of April. That compares with 243 a year ago (230 in the U. S. and 13 in Canada).

Lake shipments of Lake Superior iron ore in May totaled 12,486,324 gross tons (11,884,477 tons, U. S. ports and 601,847, Canadian ports), reports the American Iron Ore Association. In the same month

(*Please turn to Page* 223)

(Advertisement)

Solution to problem on page 100



The obvious answer is 8 segments. However, you can actually make 11. In selection and application of steel, aluminum, plastics and metalworking machinery, don't settle for the obvious. Be "Metalogical"—call Ryerson.

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, June 8, 1960. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

June 8	$31.33
June 1	32.00
May Avg.	33.07
June 1959	36.07
June 1955	35.44

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	25.00-26.00
No. 1 dealer bundles	31.00-32.00
No. 2 bundles	24.00-25.00
No. 1 busheling	30.00-31.00
No. 1 factory bundles	36.00-37.00
Machine shop turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Short turnings	21.00-22.00
Cast iron borings	21.00-22.00
Cut structurals:	
2 ft and under	39.00-40.00
3 ft and under	38.00-39.00
Heavy turnings	30.00-31.00
Punchings & plate scrap	42.00-43.00
Electric furnace bundles	37.00-38.00

Cast Iron Grades

No. 1 cupola	42.00-43.00
Stove plate	42.00-43.00
Unstripped motor blocks	32.00-33.00
Clean auto cast	47.00-48.00
Drop broken machinery	*49.00-50.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*35.00-36.00*
Rails, 2 ft and under	*52.00-53.00*
Rails, 18 in. and under	*53.00-54.00*
Random rails	*46.00-47.00*
Angles, splice bars	*42.00-43.00*
Railroad specialties	*44.00-45.00*
Rails, rerolling	59.00-60.00

Stainless Steel Scrap

18-8 bundles & solids	200.00-205.00†
18-8 turnings	100.00-105.00†
430 bundles & solids	100.00-105.00†
430 turnings	50.00-55.00†

CHICAGO

No. 1 hvy melt., indus.	*30.00-31.00*
No. 1 hvy melt., dealer	*28.00-29.00*
No. 2 hvy melting	*25.00-26.00*
No. 1 factory bundles	34.00-35.00
No. 1 dealer bundles	*29.00-30.00*
No. 2 bundles	*19.00-20.00*
No. 1 busheling, indus.	*30.00-31.00*
No. 1 busheling, dealer	*28.00-29.00*
Machine shop turnings	14.00-15.00
Mixed borings, turnings	16.00-17.00
Shovel turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut structurals, 3 ft	35.00-36.00
Punchings & plate scrap	36.00-37.00

Cast Iron Grades

No. 1 cupola	42.00-43.00
Stove plate	37.00-38.00
Unstripped motor blocks	35.00-36.00
Clean auto cast	*48.00-49.00*
Drop broken machinery	*48.00-49.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*32.00-33.00*
R.R. malleable	48.00-49.00
Rails, 2 ft and under	*46.00-47.00*
Rails, 18 in. and under	*47.00-48.00*
Angles, splice bars	41.00-42.00
Axles	*49.00-50.00*
Rails, rerolling	*49.00-50.00*

Stainless Steel Scrap

18-8 bundles, solids	*185.00-190.00*
18-8 turnings	100.00-105.00
430 bundles & solids	*85.00-90.00*
430 turnings	*45.00-50.00*

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	25.00-26.00
No. 2 heavy melting	14.00-15.00
No. 1 bundles	28.00-29.00
No. 2 bundles	12.50-13.50
No. 1 busheling	24.00-25.00
Machine shop turnings	10.00-11.00
Mixed borings, turnings	9.00-10.00
Shovel turnings	8.00-9.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Stove plate	30.00-31.00
Heavy breakable	30.00-31.00
Unstripped motor blocks	22.00-23.00
Charging box cast	30.00-31.00
Clean auto cast	43.00-44.00

CLEVELAND

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	23.00-24.00
No. 1 factory bundles	34.00-35.00
No. 1 bundles	31.00-32.00
No. 2 bundles	17.00-18.00
No. 1 busheling	31.00-32.00
Machine shop turnings	12.00-13.00
Shovel turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut foundry steel	32.00-33.00
Cut structurals, plate 2 ft and under	39.00-40.00
Low phos. punchings & plate	31.00-32.00
Alloy free, short shovel turnings	17.00-18.00
Electric furnace bundles	33.00-34.00

Cast Iron Grades

No. 1 cupola	44.00-45.00
Charging box cast	33.00-34.00
Heavy breakable cast	30.00-31.00
Stove plate	39.00-40.00
Unstripped motor blocks	32.00-33.00
Brake shoes	35.00-36.00
Clean auto cast	50.00-51.00
Burnt cast	40.00-41.00
Drop broken machinery	50.00-51.00

Railroad Scrap

R.R. malleable	49.00-50.00
Rails, 2 ft and under	54.00-55.00
Rails, 18 in. and under	55.00-56.00
Rails, random lengths	47.00-48.00
Cast steel	40.00-41.00
No. 1 railroad cast	50.00-51.00
Railroad specialties	45.00-46.00
Angles, splice bars	45.00-46.00
Rails, rerolling	56.00-57.00

Stainless Steel Scrap (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	185.00-190.00
18-8 turnings	85.00-90.00
430 clips, bundles, solids	90.00-95.00
430 turnings	20.00-30.00

YOUNGSTOWN

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	25.00-26.00
No. 1 busheling	33.00-34.00
No. 1 bundles	33.00-34.00
No. 2 bundles	20.00-21.00
Machine shop turnings	15.00-16.00
Shovel turnings	20.00-21.00
Cast iron borings	20.00-21.00
Low phos.	35.00-36.00
Electric furnace bundles	35.00-36.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-35.00

BUFFALO

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	30.00-31.00
No. 2 bundles	22.00-23.00
No. 1 busheling	30.00-31.00
Shovel turnings	19.00-20.00
Machine shop turnings	14.00-15.00
Cast iron borings	17.00-18.00
Low phos. structurals and plate, 2 ft and under	41.00-42.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	42.00-43.00
No. 1 machinery	48.00-49.00

Railroad Scrap

Rails, random lengths	44.00-45.00
Rails, 3 ft and under	50.00-51.00
Railroad specialties	41.00-42.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	26.50-27.50
No. 2 heavy melting	22.50-23.50
No. 1 bundles	26.50-27.50
No. 2 bundles	*17.50-18.50*
No. 1 busheling	26.50-27.50
Machine shop turnings	10.00-11.00
Mixed borings, turnings	10.00-11.00
Shovel turnings	12.00-13.00
Cast iron borings	12.00-13.00
Low phos. 18 in.	34.00-35.00

Cast Iron Grades

No. 1 cupola	37.00-38.00
Heavy breakable cast	32.00-33.00
Charging box cast	36.00-37.00
Drop broken machinery	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	31.00-32.00
Rails, 18 in. and under	52.00-53.00
Rails, random lengths	45.00-46.00

PHILADELPHIA

No. 1 heavy melting	*34.00*
No. 2 heavy melting	*30.00*
No. 1 bundles	*36.00*
No. 2 bundles	*20.00*
No. 1 busheling	*36.00*
Electric furnace bundles	*37.00*
Mixed borings, turnings	17.00†
Shovel turnings	21.00†
Machine shop turnings	*15.00*
Heavy turnings	*28.00*
Structurals & plates	38.00-40.00
Couplers, springs, wheels	*41.00*
Rail crops, 2 ft & under	*56.00-57.00*

Cast Iron Grades

No. 1 cupola	41.00
Heavy breakable cast	*41.00*
Drop broken machinery	51.00-52.00
Malleable	*51.00*

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	21.00-22.00
No. 1 bundles	31.00-32.00
No. 2 bundles	16.00-17.00
Machine shop turnings	7.00-8.00†
Mixed borings, turnings	8.00-9.00†
Shovel turnings	9.00-10.00†
Low phos. structurals & plates	38.00-39.00

Cast Iron Grades

No. 1 cupola	37.00-38.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	*32.00-33.00*

Stainless Steel

18-8 sheets, clips, solids	180.00-185.00
18-8 borings, turnings	*80.00-85.00*
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	70.00-75.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*25.00-25.50*
No. 2 heavy melting	22.00-23.00
No. 1 bundles	*25.00-25.50*
No. 1 busheling	*25.00-25.50*
Machine shop turnings	6.00-7.00
Shovel turnings	*9.00-10.00*
No. 1 cast	39.00-40.00
Mixed cupola cast	32.00-33.00
No. 1 machinery cast	40.00-42.00

BIRMINGHAM

No. 1 heavy melting	28.00-29.00
No. 2 heavy melting	23.00-24.00
No. 1 bundles	28.00-29.00
No. 2 bundles	18.00-19.00
No. 1 busheling	*32.00-33.00*
Cast iron borings	10.00-11.00
Machine shop turnings	18.00-19.00
Shovel turnings	*20.00-21.00*
Bar crops and plate	*37.00-38.00*
Structurals & plate	*36.00-37.00*
Electric furnace bundles	*33.00-34.00*
Electric furnace:	
3 ft and under	*32.00-33.00*
2 ft and under	33.00-34.00

Cast Iron Grades

No. 1 cupola	*48.00-49.00*
Stove plate	*48.00-49.00*
Unstripped motor blocks	38.00-39.00
No. 1 wheels	42.00-43.00

Railroad Scrap

No. 1 R.R. heavy melt.	*28.00-29.00*
Rails, 18 in. and under	45.00-46.00
Rails, random lengths	40.00-41.00
Angles, splice bars	40.00-41.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	31.00†
No. 2 heavy melting	28.00†
No. 1 bundles	33.00†
No. 2 bundles	19.00†
No. 1 busheling	33.00†
Machine shop turnings	*10.00†*
Shovel turnings	*12.00†*

Cast Iron Grades

No. 1 cupola	45.00†
Charging box cast	37.00†
Heavy breakable cast	35.00†
Unstripped motor blocks	35.00†
Clean auto cast	47.00†
Stove plate	39.00†

Railroad Scrap

No. 1 R.R. heavy melt.	34.00†
Rails, random lengths	40.00†
Rails, rerolling	50.00†
Rails, 18 in. and under	43.00†
Angles, splice bars	41.00†

HOUSTON

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	34.00
No. 2 heavy melting	31.00
No. 2 bundles	19.00
Machine shop turnings	13.00-13.50
Low phos. plate & structurals	38.00-39.00

Cast Iron Grades

No. 1 cupola	35.00
Heavy breakable	27.00†
Foundry malleable	31.00†
Unstripped motor blocks	31.00-32.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00†

LOS ANGELES

No. 1 heavy melting	32.00
No. 2 heavy melting	29.00
No. 1 bundles	27.00
No. 2 bundles	17.00
Machine shop turnings	15.00
Shovel turnings	15.00
Cast iron borings	*15.00*
Cut structurals and plate 1 ft and under	43.00

Cast Iron Grades

No. 1 cupola	*43.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*32.00-34.00*

PORTLAND, OREG.

(Prepared, f.o.b. car)

No. 1 heavy melting	35.00
No. 2 heavy melting	32.00
No. 1 bundles	29.00
No. 2 bundles	23.00
Shovel turnings	15.00
Electric furnace bundles	48.00

Cast Iron Grades

No. 1 cupola	35.00
Heavy breakable	31.00
Unstripped motor blocks	25.00
Stove plate (f.o.b. plant)	21.00

SEATTLE

(Prepared, f.o.b. car)

No. 1 heavy melting	35.00
No. 2 heavy melting	32.00
No. 2 bundles	23.00
Machine shop turnings	15.00
Mixed borings, turnings	15.00
Electric furnace No. 1	48.00

Cast Iron Grades

No. 1 cupola	35.00
Heavy breakable cast	31.00
Unstripped motor blocks	25.00
Stove plate (f.o.b. plant)	20.00

SAN FRANCISCO

No. 1 heavy melting	34.00
No. 2 heavy melting	30.00
No. 1 bundles	30.00
No. 2 bundles	20.00
Machine shop turnings	14.00
Mixed borings, turnings	14.00
Cast iron borings	14.00
Heavy turnings	14.00
Shovel turnings	14.00
Cut structurals, 3 ft	40.00

Cast Iron Grades

No. 1 cupola	46.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices)

No. 1 heavy melting	*25.80*
No. 2 heavy melting	*25.50*
No. 1 bundles	*25.80*
No. 2 bundles	*19.00*
Mixed steel scrap	*16.00*
Mixed borings, turnings	*12.00*
Busheling, new factory:	
Prepared	*25.50*
Unprepared	*20.45*
Shovel turnings	*12.00*

Cast Iron Grades‡

No. 1 machinery cast	43.00

†Nominal.
‡F.o.b. Hamilton, Ont.

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.1350	227,000 "	**258,000 "**	258,000 "
.0800	244,000 "	**276,000 "**	282,000 "
.0200	310,000 "	**320,000 "**	350,000 "

If you now use music wire, or have been prevented from using it because of its high cost, it makes sense to investigate PAGE *Special* HB.

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Kaiser's Move Pays Off

A change in approach, accessibility to markets rather than production benefits should determine plant location, sparked building of Ravenswood Works

Nonferrous Metal Prices, Pages 222 & 223

THE FIRST attempt at market orientation of a production facility by an aluminum company is paying off, believes Kaiser Aluminum & Chemical Co.

When ground was broken in February, 1955, for Kaiser's $200 million primary production and fabrication works near Ravenswood, W. Va., the company made no secret it was building the plant to capture a bigger share of the large aluminum consuming market that lies east of the Mississippi. The unusual feature: It marked the first time an integrated facility was located principally for its accessibility to markets rather than production benefits, such as power.

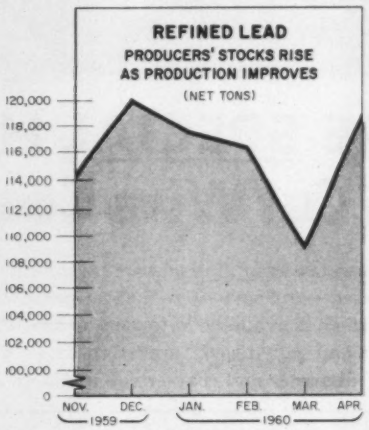
• **Near Customers** — Kaiser reasoned: Put a compass on the point on the map representing this Ohio River village, draw a circle with a radius of 500 miles, and you have the market for 70 per cent of the sheets, plates, and foil consumed in the U. S. (all are products of the Kaiser plant).

How has Kaiser's experiment paid off? (Primary production started in November, 1957, hot rolling in May, 1958. Construction was completed two months ago.)

First, indications are strong that the premise (70 per cent of the sheet, plate, and foil customers operate within 500 miles of Ravenswood) was accurate. Two weeks ago, a study was made of all orders then on file. Out of 2836 orders, 77.3 per cent (2191) had been received from customers within 500 miles of Ravenswood.

Second, Kaiser sales people are convinced the company has many new customers it would not have won with production at only West and Gulf Coasts.

Third, proximity to markets offsets the higher cost of using coal in lieu of hydroelectric power. Freight costs are lower, though not as much as anticipated. Reason: About 70 per cent of the Ravenswood output is moved by trucks to satisfy customer demands for immediate delivery.



Source: American Bureau of Metal Statistics

• **Big Job Shop**—Fast delivery and close customer contact have become increasingly important ever since capacity to produce outgrew demand a few years ago. That is particularly true in aluminum. Producers have had to fight the bugaboo of running a large job shop operation. At Ravenswood, for example, where production lines are working on three week lead-time, you'll see as many as 2000 orders in process at one time. When you take into account the different shapes, alloys, widths, tempers, and gages, the plant may be called on to turn out 26,000 different products over a fairly short period.

That is why the industry has been urgently seeking markets which will take large tonnage, standardized products. The current controversy raging around building sheet prices basically stems from a move to get long run production items.

• **The Trend**—Future location of integrated aluminum facilities will almost certainly be made from the standpoint of accessibility to markets. Ormet Corp., the nation's fourth largest producer, has built a reduction plant on the Ohio, about 70 miles north of Ravenswood, and Olin Mathieson Chemical Corp. (one of Ormet's owners) has a new rolling mill at the same location. Rumors are strong that other aluminum facilities will go up along the Ohio.

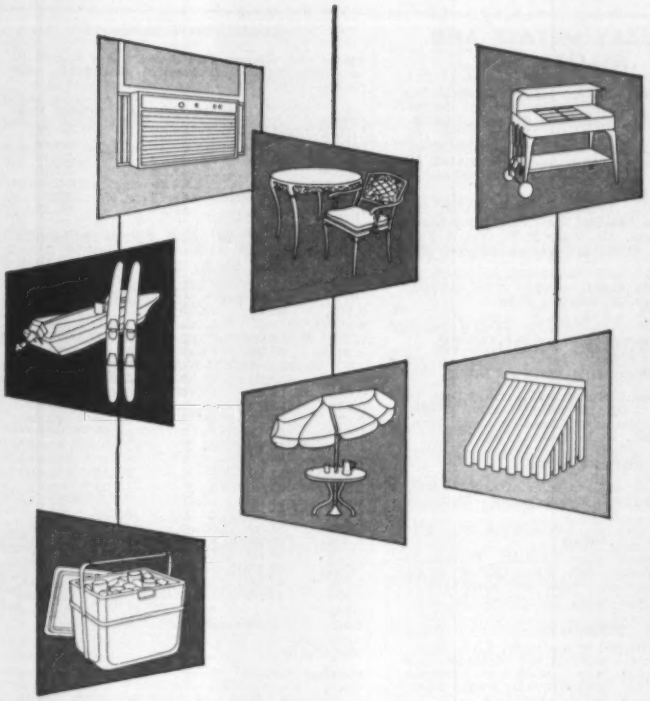
In the Markets

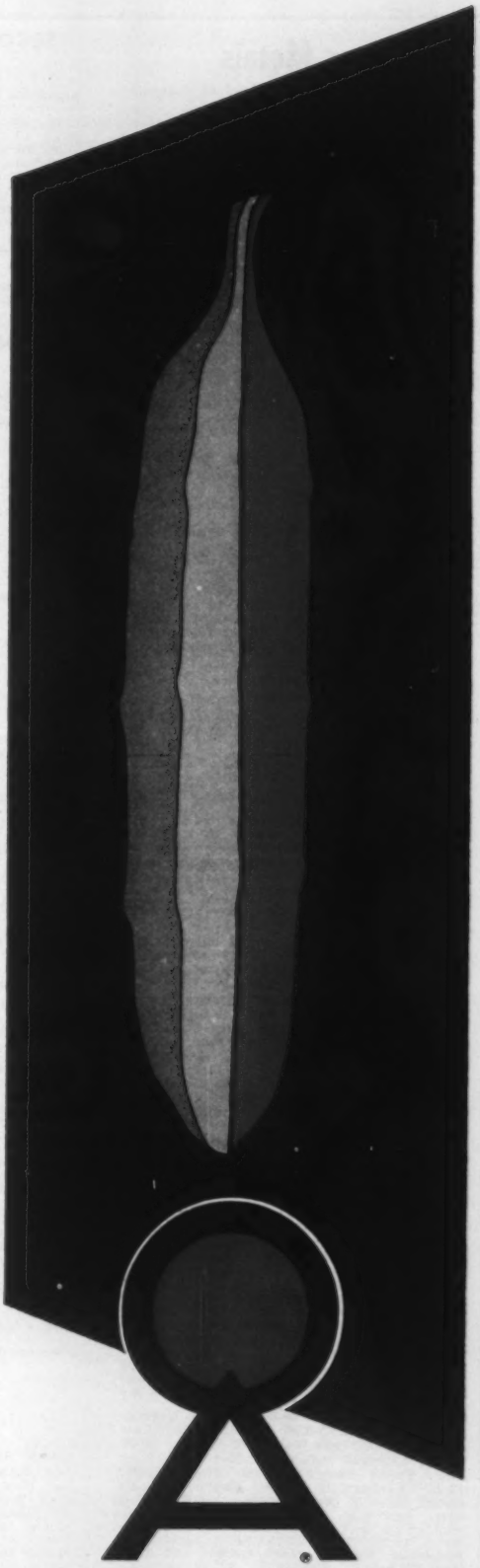
• **Lead-Zinc Bill Wilts**—Chances for passage of any lead-zinc legislation during this session of Congress appear to have dived to zero with the refusal of the House Rules Committee to report out a bill that would provide subsidy payments to small producers. Some observers who felt this bill had the best chance of passage now believe odds rule out any lead-zinc legislation before 1961.

NONFERROUS PRICE RECORD

	June 1 Price	Last Change	Previous Price	May Avg	Apr. Avg	June, 1959 Avg
Aluminum	26.00	Dec. 17, 1959	24.70	26.000	26.000	24.700
Copper	33.00	Mar. 10, 1960	33.00–35.00	33.000	33.000	31.490
Lead	11.80	Dec. 21, 1959	12.30	11.800	11.800	11.800
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	101.00	June 3, 1960	100.875	99.570	99.260	104.284
Zinc	13.00	Jan. 8, 1960	12.50	13.000	13.000	11.000

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. customer custody; MAGNESIUM, pig, 99.8%, Velasco, Tex.





THIS SUMMER
PLAY IT COOL...
WITH
OLIN ALUMINUM

Why get hot and bothered over supply problems? Whenever you need aluminum, take a tip from leading consumer products makers—call Olin Aluminum. Then relax. The alloys, tempers and finishes you need... in the forms and quantities you want... are as good as in your plant when you need them.

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OLIN ALUMINUM

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 26.00; ingots, 28.10, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.60; No. 43, 25.90; No. 195, 30.70; No. 214, 31.50; No. 356, 26.30, 30 lb ingots; 10 lb ingots, add 0.4 cent per lb; 6 lb ingots, add 0.6 cent per lb.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 25.00-26.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.
Cadmium: Sticks and bars, $1.50 per lb deld.
Cobalt: 99+%, $1.50 per lb for 500-lb keg, $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $55-85 per lb nom.
Copper: Electrolytic, 33.00 deld.; custom smelters, 33.00; lake, 33.00 deld.; fire refined, 32.75 deld.

Germanium: First reduction, ingots, less than 1 kg, 36.00-37.50 per gram; 1-10 kg, 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $75-80 per troy oz nom.

Lead: Common, 11.80; chemical, 11.90; corroding, 11.90, St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb f.o.b. Minneapolis; 24-99 lb, $9.50; 100-449 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $213-215 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-7.0 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, in kegs, 74.50; "F" nickel, 5 lb ingots, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 69.60.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.
Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.
Selenium: $7 per lb, commercial grade.
Silver: Open market, 91.375 per troy oz.
Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.
Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom; sheet, $55 per lb nom.
Tellurium: $3.50 per lb, 100 lb or more.
Thallium: $7.50 per lb.
Tin: Straits, N. Y., spot, and prompt, 101.00.
Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max.), $1.50 per lb.
Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $3.50-4.25.
Zinc: Prime western, 13.00; brass special, 13.25; intermediate, 13.00, East St. Louis, freight allowed over 0.50 per lb, New York basis, add 0.50. High grade, 14.50; special high grade, 14.75 deld. Diecasting alloy ingot No. 3, 16.25; No. 2, 16.75; No. 5, 16.50 deld.
Zirconium: Reactor grade sponge, 100 lb or less, $8 per lb; 100-500 lb, $7 per lb; over 500 lb, $6.50 per lb.
(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 27.00-28.00; No. 12 foundry alloy (No. 2 grade), 23.75-25.00; 5% silicon alloy, 0.60 Cu max., 25.00-25.25; 13 alloy, 0.60 Cu max., 25.00-25.25; 195 alloy, 26.75-27.75; 108 alloy, 24.25-25.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 25.00; grade 2, 23.75; grade 3, 22.75; grade 4, 22.25.

Brass Ingot: Red brass, No. 115, 29.25; tin bronze, No. 225, 39.50; No. 245, 34.00; high-leaded tin bronze, No. 305, 33.75; No. 1 yellow, No. 405, 23.75; manganese bronze, No. 421, 28.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.975, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.955, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 38.35; l.c.l., 38.98. Weatherproof, 20,000-lb lots, 38.55; l.c.l., 39.30.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $17.50 per cwt; pipe, full coils, $17.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $3.80-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Widths (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.10-47.70
0.136-0.096	24-72	72-180	45.50-48.70
0.096-0.077	24-72	72-180	46.20-50.00
0.077-0.068	24-72	72-180	46.70-51.70
0.068-0.061	24-72	72-180	46.70-55.50
0.061-0.048	24-72	72-180	47.30-57.30
0.048-0.038	24-72	72-180	47.80-60.20
0.038-0.030	24-72	72-180	48.20-65.30
0.030-0.024	24-60	72-180	48.70-56.60
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-144	54.60
0.011-0.0095	24-36	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and Circles: Thickness, 0.25-3 in.; width or diam., 24-60 in.; lengths, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	44.60	49.40
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base, 12 ft

Diam. (in.)*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	72.90	75.80	....	....
0.188	....	....	....	78.20
0.250	58.00	61.60	70.70	72.30
0.375	57.20	62.40	69.00	70.50
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	57.20	62.40	69.00	70.50
0.625	57.20	62.40	65.80	66.60
0.750	55.70	60.70	59.60	62.60
0.875	55.70	60.70	59.60	62.60
1.000	55.70	60.70	59.60	62.60
1.125	53.30	58.30	57.50	60.40
1.250	53.30	58.30	57.50	60.40
1.375	53.30	58.30	57.50	60.40
1.500	53.30	58.30	57.50	60.40
1.625	51.00	55.60	....	58.20
1.750	51.00	55.60	56.30	58.20
1.875	51.00	55.60	....	58.20
2.000	51.00	55.60	56.30	58.20
2.250	49.50	54.00	....	58.20
2.500	49.50	54.00	....	58.20
2.750	47.90	52.20	....	58.20
3.000	47.90	52.20	....	58.20
3.250	....	52.20	....	....
3.375	....	52.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam., 0.375-8 in., "F" temper; 2014, 47.20-56.90; 6061, 43.20-56.90; 7075, 61.50-71.20; 7079, 66.50-76.20.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 31.55; 1¼ in., 42.75; 1½ in., 51.05; 2 in., 61.70; 3 in., 123.40; 4 in., 169.55; 5 in., 229.60; 6 in., 304.60; 8 in., 458.40; 10 in., 706.45 (3-24 ft lengths).

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	44.70-46.20	53.20-59.00
15-17	44.70-46.20	55.60-60.80
18-23	45.20-46.80	57.70-66.40
24-32	45.20-46.80	65.60-78.80
33-38	48.80-51.40	82.30-93.40
39-44	58.70-62.40	99.90-121.00

MAGNESIUM

Sheets and Plates: AZ31B standard grade, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades. .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.60	94.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 23.00-23.50; No. 2 heavy copper and wire, 20.00-20.50; light copper, 18.00-18.50; No. 1 composition red brass, 17.00-17.25; No. 1 com-

BRASS MILL PRICES

MILL PRODUCTS a

	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes
Copper	50.00b	54.86c	....	58.32
Yellow Brass	50.57	36.06d	50.86	54.23
Low Brass, 80%	53.53	53.22	53.82	57.09
Red Brass, 85%	54.58	54.27	54.87	58.14
Com. Bronze, 90%	56.17	55.86	56.46	59.48
Manganese Bronze	58.86	52.21	62.69	....
Muntz Metal	53.20	48.26	....	....
Naval Brass	55.12	48.68	61.43	58.78
Silicon Bronze	62.86	61.80	62.15	80.79
Nickel Silver, 10%	65.98	68.06	68.06	....
Phos. Bronze	77.44	78.19	77.69	79.37

SCRAP ALLOWANCES e (Based on copper at 30.00c)

	Clean Heavy	Rod Ends	Clean Turnings
Copper	29.000	29.000	28.250
Yellow Brass	22.250	21.250	20.250
Low Brass, 80%	24.750	24.500	24.000
Red Brass, 85%	25.750	25.500	25.000
Com. Bronze, 90%	26.750	26.500	26.000
Manganese Bronze	20.875	26.625	19.875
Muntz Metal	20.875	20.625	20.125
Naval Brass	20.750	20.500	20.000
Silicon Bronze	28.375	28.125	27.375
Nickel Silver, 10%	26.875	26.625	14.937
Phos. Bronze	29.875	29.625	28.625

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 15.50-15.75; new brass clippings, 14.00-14.50; light brass, 10.50-10.75; heavy yellow brass, 11.50-11.75; new brass rod ends, 12.50-12.75; auto radiators, unsweated, 12.50-12.75; cocks and faucets, 13.50-14.00; brass pipe, 14.00-14.50.

Lead: Soft scrap lead, 8.00-8.25; battery plates, 3.00-3.25; linotype and stereotype, 9.00-9.50; electrotype, 8.00-8.25; mixed babbitt, 9.50-10.00.

Monel: Clippings, 24.00-25.00; old sheets, 22.00-23.00; turnings, 19.00-20.00; rods, 24.00-25.00.

Nickel: Sheets and clips, 50.00-51.00; rolled anodes, 50.00-51.00; turnings, 39.00-41.00; rod ends, 50.00-51.00.

Zinc: Old zinc, 4.00-4.50; new diecast scrap, 4.00-4.50; old diecast scrap, 2.00-2.25.

Aluminum: Old castings and sheets, 10.50-11.00; clean borings and turnings, 6.50-7.00; segregated low copper clips, 14.00-14.50; segregated high copper clips, 13.00-13.50; mixed low copper clips, 14.00-14.50; mixed high copper clips, 12.00-12.50.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 11.00-11.50; clean borings and turnings, 8.00-8.50; segregated low copper clips, 15.50-16.00; segregated high copper clips, 14.00-14.50; mixed low copper clips, 14.00-14.50; mixed high copper clips, 13.50-14.00.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 11.00-11.25; clean borings and turnings, 9.50-10.00; segregated low copper clips, 14.75-15.00; segregated high copper clips, 14.00-14.50; mixed low copper clips, 14.00-14.50; mixed high copper clips, 13.50-14.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 59.00; light scrap, 54.00; turnings and borings, 39.00.

Copper and Brass: No. 1 heavy copper and wire, 26.50; No. 2 heavy copper and wire, 23.75; light copper, 21.50; refinery brass (60% copper) dry copper content, 22.25.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 26.50; No. 2 heavy copper and wire, 23.75; light copper, 21.50; No. 1 composition borings, 19.75; No. 1 composition solids, 20.50; heavy yellow brass solids, 15.00; yellow brass turnings, 14.00; radiators, 16.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.50.

Copper: Flat-rolled, 50.04; oval, 46.50, 5000-10,000 lb, electrodeposited, 42.00, 2000-5000 lb lots; cast, 44.50, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 1000 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 119.50; 200-499 lb, 118.00; 500-999 lb, 117.50; 1000 lb or more, 117.00.

Zinc: Balls, 20.50; flat tops, 20.50; flats, 23.25; ovals, 22.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.50 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,0000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.

Copper Sulphate: 100-1900 lb, 16.00; 2000-5900 lb, 14.00; 6000-11,900 lb, 13.75; 12,000-22,900 lb, 13.50; 23,000 lb or more, 13.00.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,900 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-800 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 79.10; 100-600 lb, 69.70; 700-1900 lb, 67.00; 2000-9900 lb, 65.10; 10,000 lb or more, 63.80.

Stannous Chloride (Anhydrous): 25 lb, 154.40; 100 lb, 149.50; 400 lb, 147.10; 800-19,900 lb, 106.20; 20,000 lb or more, 100.10.

Stannous Sulphate: Less than 50 lb, 139.60; 50 lb, 109.60; 100-1900 lb, 107.60; 2000 lb or more, 105.60.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(Concluded from Page 217)

last year, the total was 12,765,446 tons (12,143,711 at U. S. ports and 621,735 at Canadian ports).

Shipments to June 1 totaled 18,162,255 tons, up 2,417,024 tons from the 15,745,231 tons moved to the same date in the 1959 season. Of the total, 17,513,420 tons were shipped from U. S. ports and 648,825 from Canadian ports.

Goodyear Adjusts Prices On Conveyor Belting

An adjustment in price schedules for conveyor and elevator belting was announced last week by Goodyear Tire & Rubber Co., Akron. Prices of the most narrow and short belts are increased, while prices on the longer and wider belts are progressively decreased.

Discounts from list prices will be based on seven length categories ranging from zero per cent for lengths under 50 ft to as much as 41 per cent for lengths 2500 ft and over on one specification.

Rare Earth Prices Cut

Establishment of a revised price list on rare earth metals is announced by the Research Chemicals Div., Nuclear Corp. of America, Burbank, Calif. Price reductions have been put into effect on 12 rare earth metals, including yttrium, cerium, holmium, and erbium. The company hopes the lower price schedule will stimulate increased use of rare earth metals in experimental and research programs.

Canadian Steel Rate Off

Steel mill operations in Canada continue to drop. For the week ended May 28 output was 100,397 tons (77.7 per cent) vs. 107,465 tons (83.2 per cent) in the preceding week. At the beginning of the year, the industry was operating above rated capacity.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 213

Production of coke (oven and beehive) in April totaled 5,760,669 net tons (5,653,846 oven and 106,823 beehive), reports the U. S. Bureau of Mines. In March, output was 6,377,466 tons (6,243,212 oven and 134,254 beehive). Output in April a year ago totaled 6,235,980 tons (6,074,002 oven and 161,978 beehive).

Stocks of oven coke held by producers at the end of April totaled 3,752,298 net tons, equal to 19.9 days' production. On the same date a year ago, the total was 3,422,876 tons, equal to 17.6 days' output.

Ferroalloys . . .

Ferroalloy Prices, Page 214

Production of silicon alloys and metals in the first quarter rose 26 per cent from the last quarter of 1959, totaling 250,142 net tons, reports the U. S. Bureau of Mines. Shipments in the period, totaling 211,157 tons, were up 9 per cent. In addition, 11,516 tons of ferrosilicon and metal were consumed in producing other silicon alloys during the quarter.

Imports totaled 4,707 tons and exports 697 tons in the period. Apparent consumption was 215,167 tons, and stocks on hand at the end of March amounted to 150,581 tons.

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SALES POSITION AVAILABLE

With established manufacturer of electric welded mechanical steel tubing. Must have previous sales experience. Remuneration commensurate with ability to produce. Territory consists of Southern Ohio, Michigan and Central Indiana, in addition to other delegated duties. Based at home office. Replies in confidence. Box 858, STEEL, Penton Bldg., Cleveland 13, Ohio.

PRODUCTION MANAGER AND ESTIMATOR with pipe fabrication experience. Please reply with full particulars to Box 857, STEEL, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

CHIEF ESTIMATOR—Pressure vessels, plate and machinery. Many years experience with major companies. Reply Box 853, STEEL, Penton Bldg., Cleveland 13, Ohio.

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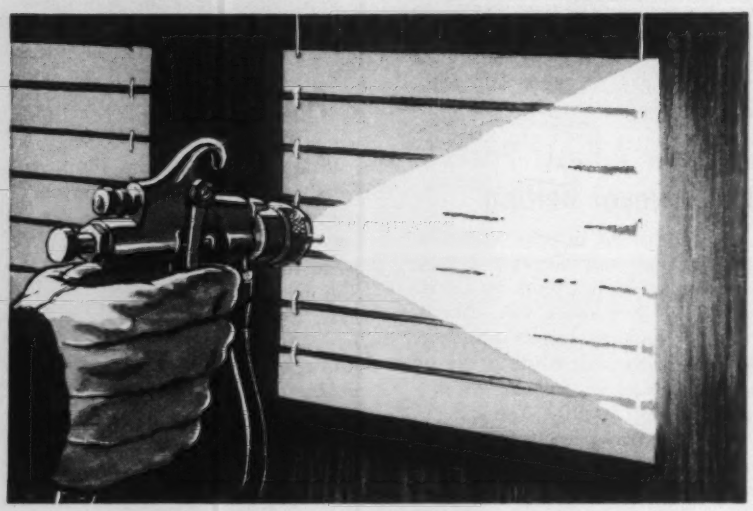

Oakite curtain water treatment takes the "tack" out of overspray

Just a few inexpensive ounces of the right Oakite additive in the spray booth water curtain save hours of clean-up time. The reason: Oakite chemicals surround each droplet of paint with an "anti-stick" film that keeps spray from adhering to walls, pumps, lines and water nozzles. Paint that doesn't settle or float immediately will still wash through the system—but it won't stick, won't clog the sprays. The result: a water curtain without gaps, a smooth running system, *no* unplanned downtime.

There's a full line of Oakite water additives . . . one to match any of the countless paints, enamels and organic coatings. The *right* one will help paint sink to the sump . . . or float to the surface for skimming off . . . or overcome special hard water troubles . . . or combat foaming problems. What's *your* problem? Ask the Oakite man to make free tests in your paint spray booth. They won't interfere with production. They may save you hours of spray booth downtime. Bulletin F-9443 tells more. Write Oakite Products, Inc., 28A Rector St., New York 6, N. Y.

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See Page 6 Servicenter For Details

STEEL's Big Usership-Idea of-the-Month Contest

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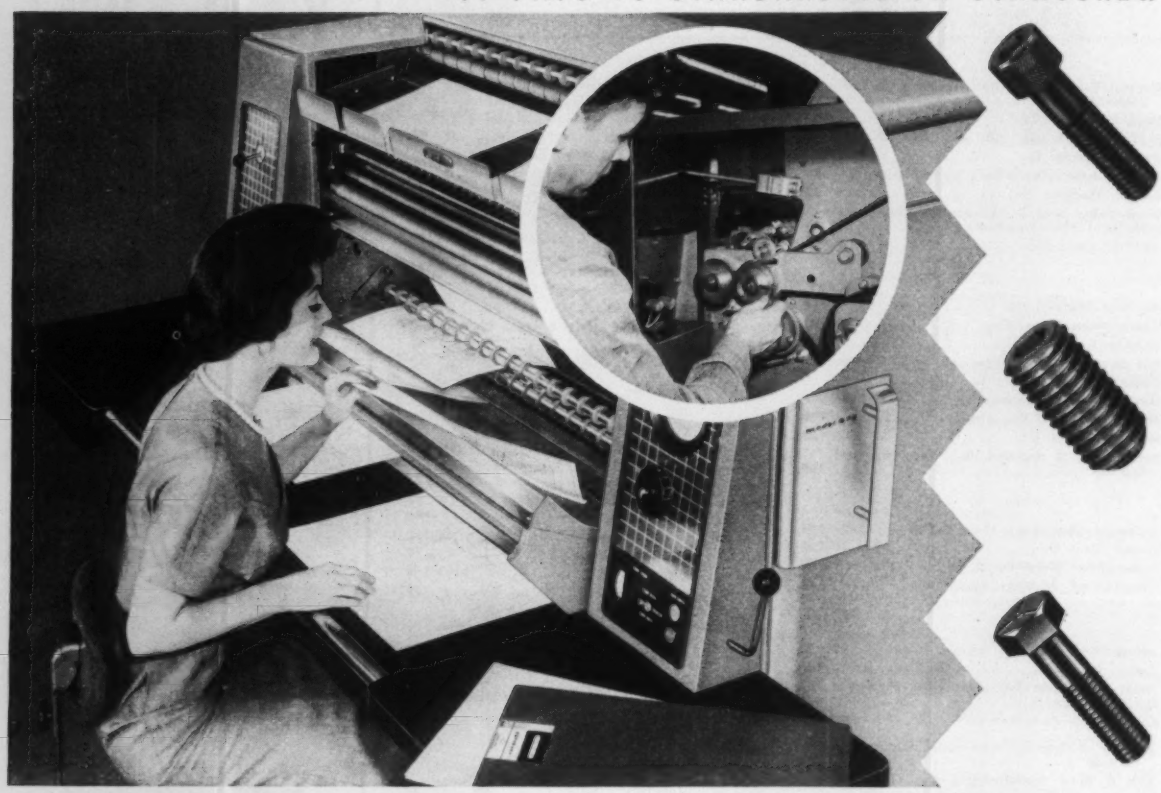

Stanscrew suggests... BRUNING verifies... Socket set screws solve *Copyflex* problem

Charles Bruning, Inc., manufacturers of the widely accepted Copyflex, recently found that the fasteners they were using to attach the unit's sprockets and gears did not meet the rigid performance standards they set up for all component parts.

Bruning's distributor arranged a visit from a Stanscrew specialist, who recommended Stanscrew's regular socket set screws. Bruning verified their operational efficiency with exhaustive laboratory and engineering tests . . . made the conversion . . . and eliminated the loosening problem (plus eliminating many service calls).

Now, 100 Stanscrew fasteners are specified for each Model 675 Copyflex. In addition to socket set screws, they include socket head, hex head, and fillister head cap screws which are used in a wide variety of critical applications.

Like Bruning, more and more industrial leaders are learning it pays to standardize on Stanscrew. Their more than 5,500 different standard fasteners provide economical answers to the overwhelming majority of all industrial requirements . . . and are produced to consistent quality standards which eliminate production problems and lower assembly costs.

The Stanscrew fastener specialist may be able to help you cut fastener costs. Your Stanscrew distributor will be happy to arrange a prompt visit. Call him today.

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HMS | HARTFORD MACHINE SCREW COMPANY, HARTFORD, CONNECTICUT
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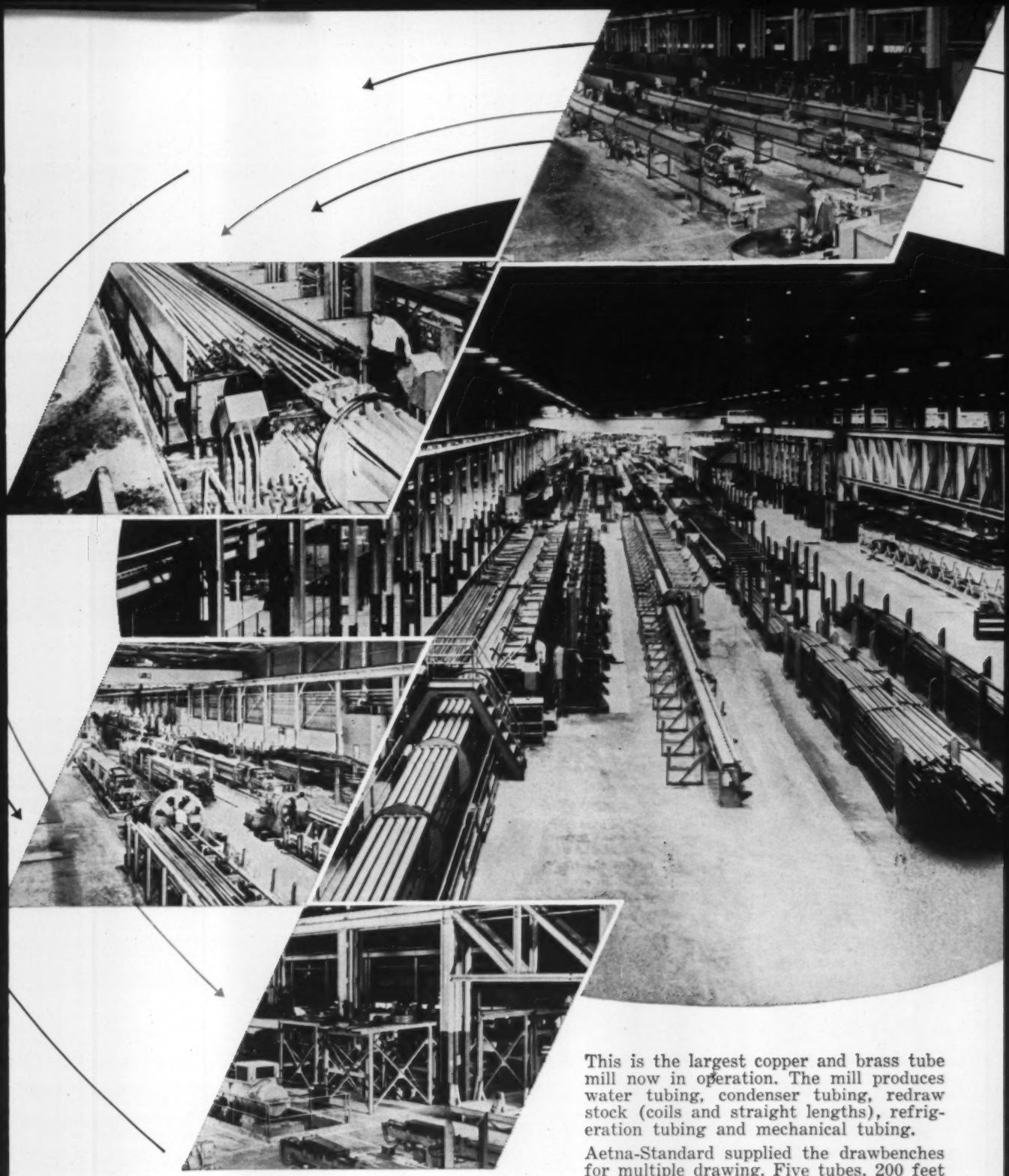

BRASS and COPPER TUBE MILL...

This is the largest copper and brass tube mill now in operation. The mill produces water tubing, condenser tubing, redraw stock (coils and straight lengths), refrigeration tubing and mechanical tubing.

Aetna-Standard supplied the drawbenches for multiple drawing. Five tubes, 200 feet in length, are drawn in a single pass. Aetna-Standard also supplied high speed 60-inch Bull Blocks with turn-style coil handling.

For information on Cold Draw equipment, write to: Aetna-Standard Division
300 Sixth Avenue
Pittsburgh, Pennsylvania

Aetna-Standard Division

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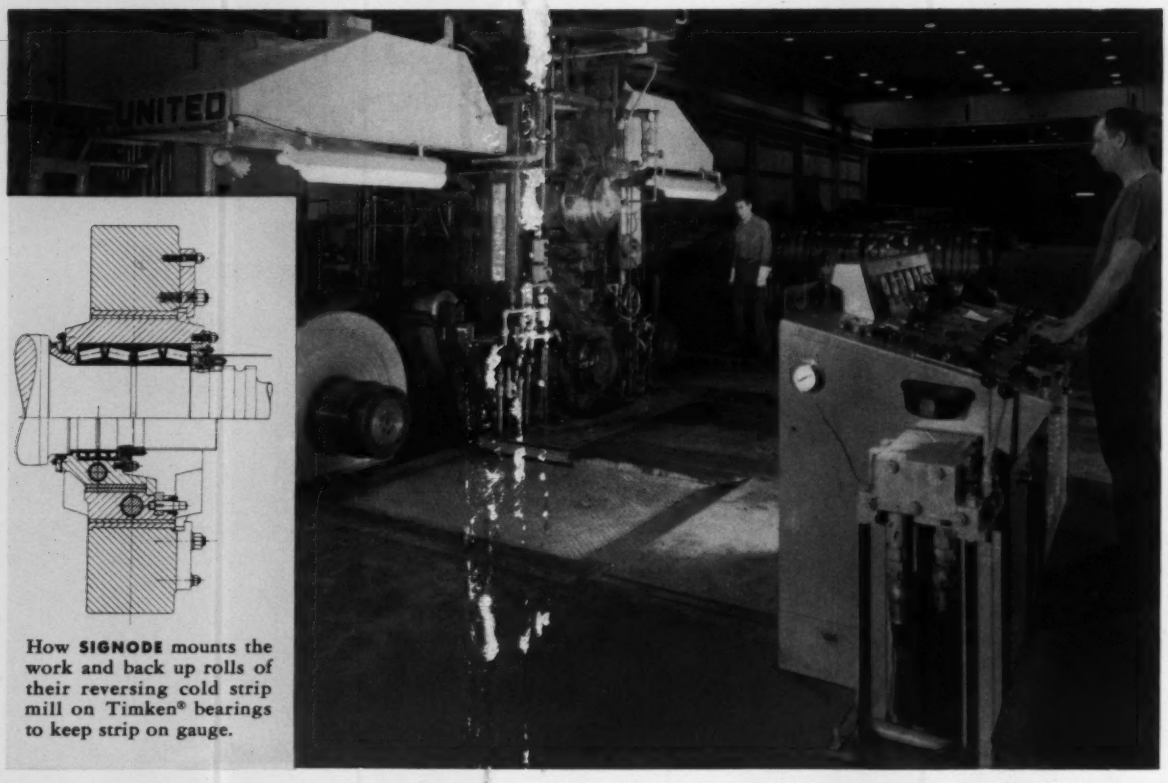


How **SIGNODE** mounts the work and back up rolls of their reversing cold strip mill on Timken® bearings to keep strip on gauge.

Signode's new strip mill controls gauge to .0001" by X-ray Timken® bearings keep it on gauge

THIS new 4-high cold strip mill built by United Engineering & Foundry for Signode Steel Strapping Company has a special X-ray gauge that measures and records strip thickness to .0001". And mounting the work rolls, back up rolls, reel and screw down on Timken® tapered roller bearings helps keep this 11¼" and 29¼" by 20" reversing cold mill turning out strip on gauge—gives Signode maximum economy, assures customers strapping of uniform gauge.

Steel mills the world over use Timken roll neck bearings because they:

1) *Require minimum maintenance.* Timken bearings are tapered and provide the high radial and thrust capacity required by modern steel mill operations.

2) *Give long life.* To make them tough, only the finest bearing-quality alloy steel available is used for Timken bearing rollers and races. In some mills, Timken balanced proportion bearings have rolled over 5,000,000 tons of steel.

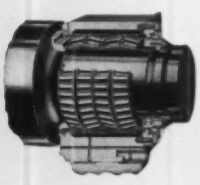
Timken bearings practically eliminate friction, cut starting resistance so that scrap losses are held to a minimum. They can be grease or oil mist lubricated to cut lubricant costs to the bone. It all adds up to the lowest bearing cost per ton of steel rolled. It's why Timken bearings are on the roll necks of 1,008 mills.

Be sure to get all these advantages when you buy or build a mill. Specify Timken tapered roller bearings and get the best in engineering service, the best in bearings. That's Better-ness. Timken bearings are the symbol of Better-ness in machines.

When you buy Timken bearings you get...

1) Quality you can take for granted.
2) Service you can't get anywhere else.
3) The best-known name in bearings.
4) Pace setter in lower bearing costs.

The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO". Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits. Canadian Division: Canadian Timken, St. Thomas, Ontario.



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